AUGUST, 1953

# Products Finishing

S Q C in Chromium Plating....Page 24
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Alloy Plating .....Page 55

*NEXT MONTH! H. Leroy Beaver on "BARREL FINISHING."*

Finishes on *Metal* Products

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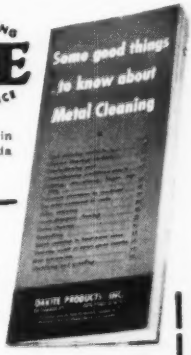


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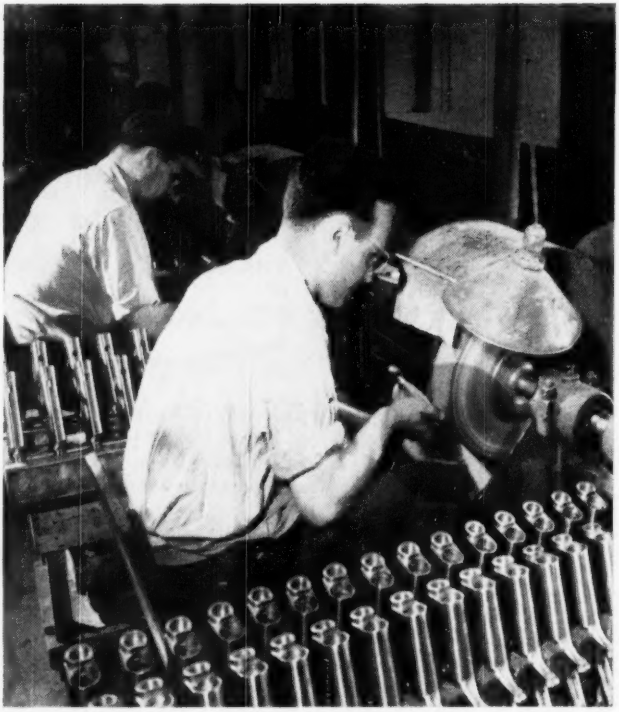

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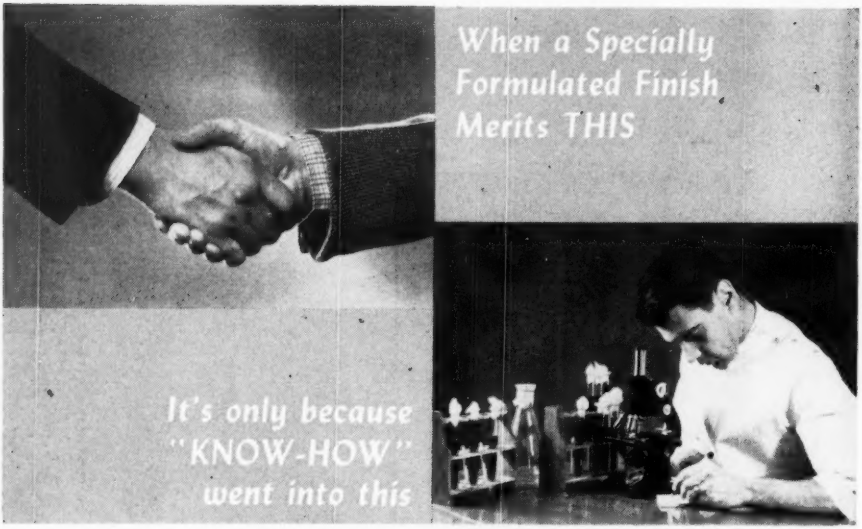


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VOLUME 17 NUMBER 11 AUGUST 1953

# PRODUCTS finishing

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**Ezra A. Blount**
*editor*

**H. Leroy Beaver**
**Frank L. Bonem**
**Dr. C. Fred Gurnham**
**Bryant W. Pocock**
**Dr. Seymour Senderoff**
*consulting and contributing editors*

**M. L. Forney**
*president*

**Gene J. Schwarber**
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**Norman S. Rogers**
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**K. M. Gettelman**
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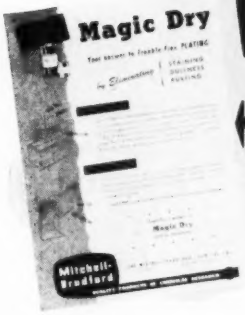


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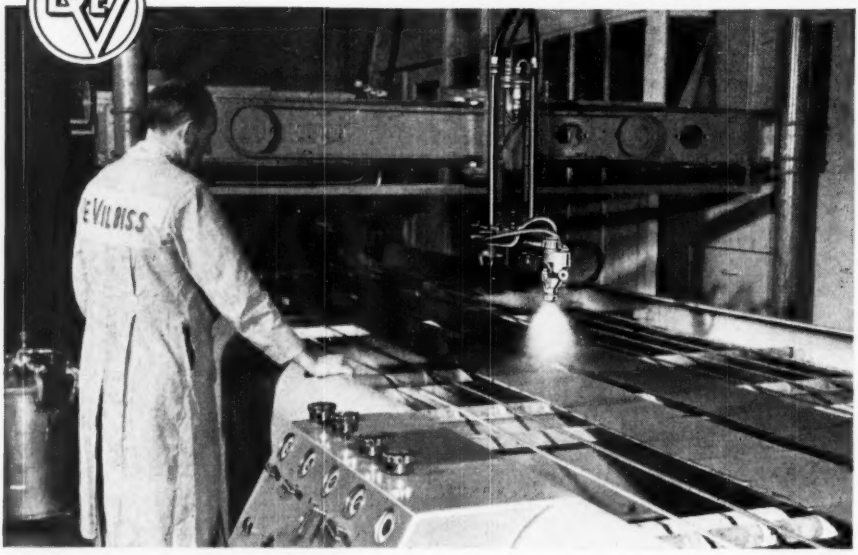


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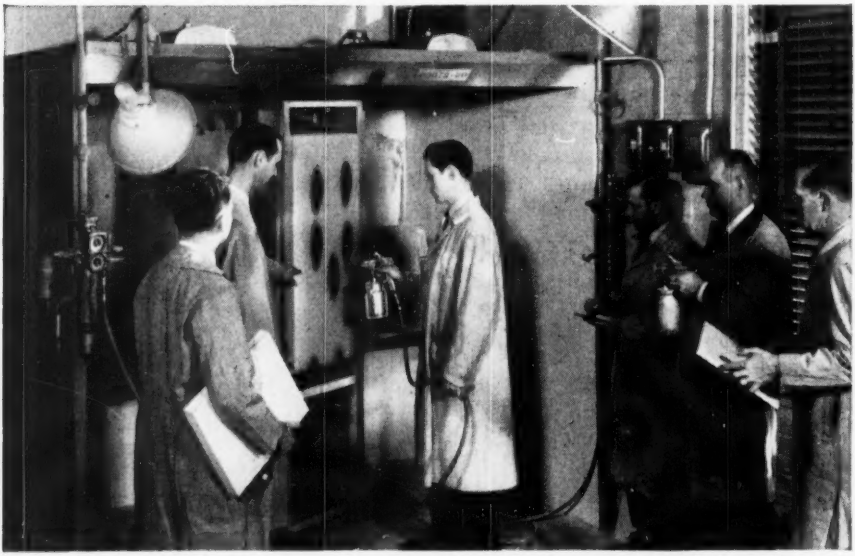

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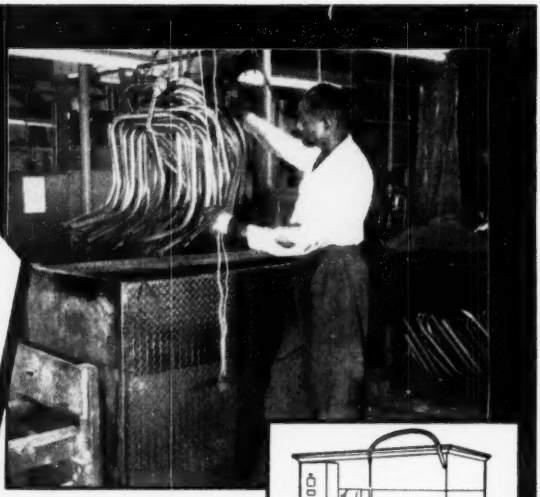

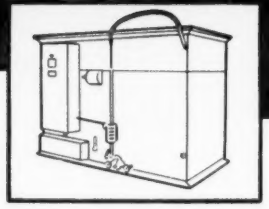

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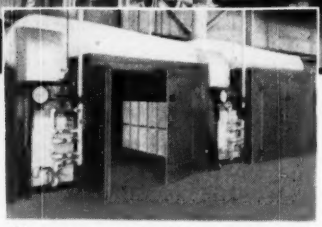
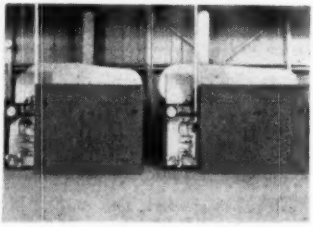


**Sheets are placed in this oven and redried before being pressed.**



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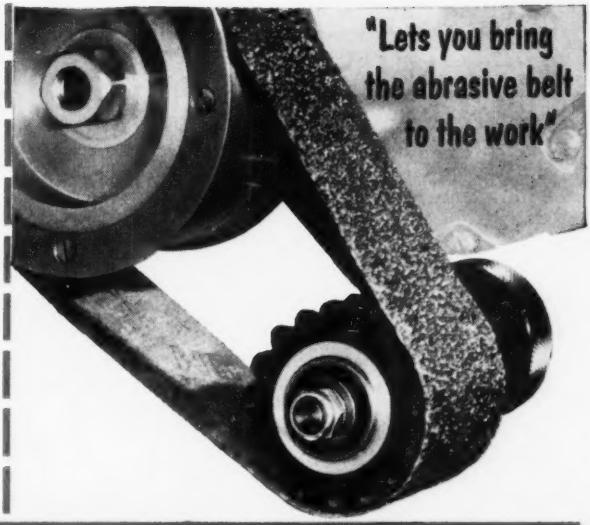


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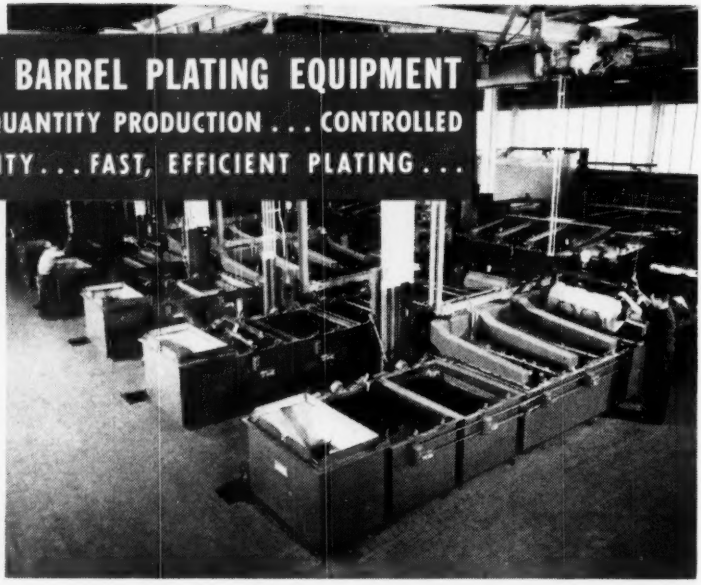

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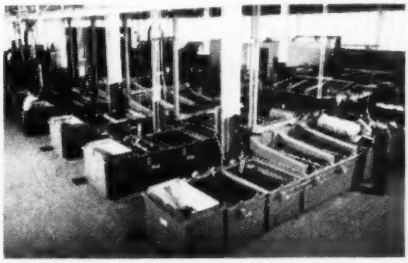

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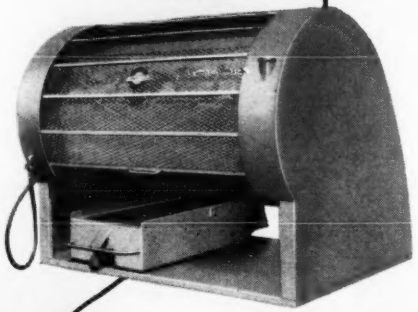
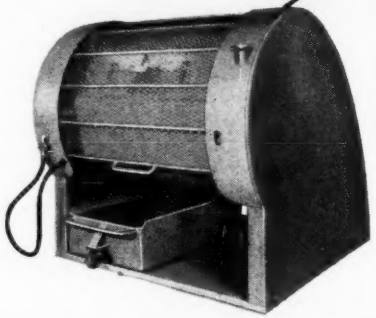


Model 66″, two compartments



Model 48″, two compartments

You can get complete equipment and supplies for faster, better tumbling at Grav-i-Flo. This authoritative tumbling source can furnish you, from its years of experience, the correct answer to any tumbling problem.

Larger capacity machines take 31% to 80% more work-load in same floor space. Improved cutting materials shorten cutting cycle by 15% to 25%. Grav-i-Flo installations substantially reduce capital investment, floor space, and production time!

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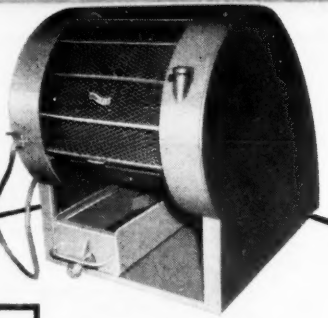

Model 36",
two compartments

Model 24",
two compartments

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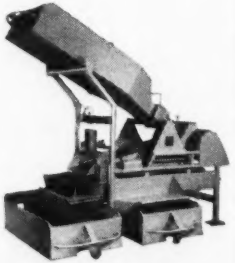

Occupies less floor space. Separates parts quickly without impingements. Grades 3 sizes of chips simultaneously.

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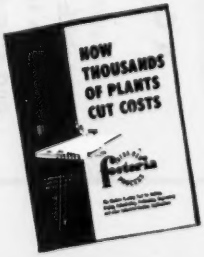


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Puts heat into the product — not into oven walls. Uses less fuel. Gold plated interior reduces heat loss to 2%. In many instances, Fostoria electric operation actually costs less than any other fuel.

**REQUIRES LESS FLOOR SPACE**

Shorter Cycles—most production for oven size. May be ceiling mounted.

**FASTEST PRODUCTION**

Fastest means of heat transfer. No warm-up required — no shut-off lag. Heat levels instantly changeable.

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Clean operation — no combustion by-products. Lowest source replacement cost.

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No room ventilation problem.

**COMPETITIVE INITIAL COST**

Comparable to any quality-built oven.

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*—BETTER QUALITY*
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**THE FOSTORIA PRESSED STEEL CORP.**
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pf editorial

AUGUST, 1953

Vol. 17, No. 11

# Keep Your Eye on The ~~Ball!~~ Finish!

Finishing room superintendents, plating supervisors, process engineers, product designers (or anyone concerned with the specification and application of finishes) all occupy a most strategic position in today's industrial picture. During the past several years manufacturers of automobiles, refrigerators, ranges, washing machines, other household appliances, as well as consumer products of all kinds, have built increased productive capacity or have modernized their plants for the same purpose. The sum total of this plant expansion has made possible a productive capacity for consumer goods that almost equals, and in some fields exceeds, the current consumer demand.

Manufacturers can take action to increase product sales and thus keep plants operating at near capacity along two general lines. Manufacturing and finishing methods can be made more efficient so that price reductions are possible. Improvements in the product's operation and particularly the product's attractiveness can be made.

In a consumer's appraisal of the value of a product, eye appeal plays a most important part. The ability of finishing executives and engineers to apply more attractive finishes at the same or lower cost may make the difference between regular plant operation and costly shut-downs. To accomplish this desirable result it may be necessary to install new finishing equipment which will make possible economies in production cost. It may be advantageous to use a different type of finish—even a more expensive one—in order that the product will have more sales appeal and consumer acceptance. The cost of the finish applied to a product is generally small as compared with the total manufacturing cost; yet an attractive finish adds value to a product far beyond its proportionate share of production cost.

Long ago the American buying public stopped "looking under the hood." Let all those individuals concerned with finish specification and application consider that theirs is the "finishing touch" which may well make the difference between the success or failure of a manufacturer's marketing plan.

Ezra A. Blount

—EDITOR

# Statistical Quality Control Chromium Plating

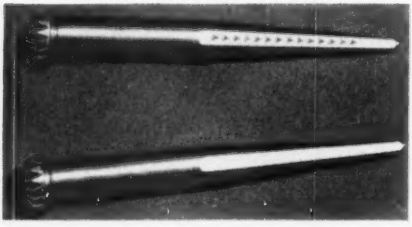
**How International Harvester reduced rejects and pin pointed trouble spots in chromium plating picker spindles through the use of Quality Control Charts is related in this article.**

By FRANK L. BONEM

PF FEATURE

Statistics show that since 1940, well over 1,600,000 workers have left agricultural regions and migrated to industrial centers. Their place has, to a large extent, been taken by farm machinery which through improved design has become increasingly efficient. One such machine is the McCormick Cotton Picker, which can do the picking formerly performed by 40 to 50 workers, who have left the land to do other work. This machine is manufactured by the International Harvester Company at its Memphis Works in Memphis, Tennessee. The picking unit for the machine is manufactured in the Evansville, Indiana, works of the company and delivered to the Memphis Works for installation in the Cotton Picker.

The picking unit, housed in a sturdy steel box and operated by the tractor power take-off, contains two vertical, revolving picker drums placed one behind the other on opposite sides of the row. Each drum is equipped with 15



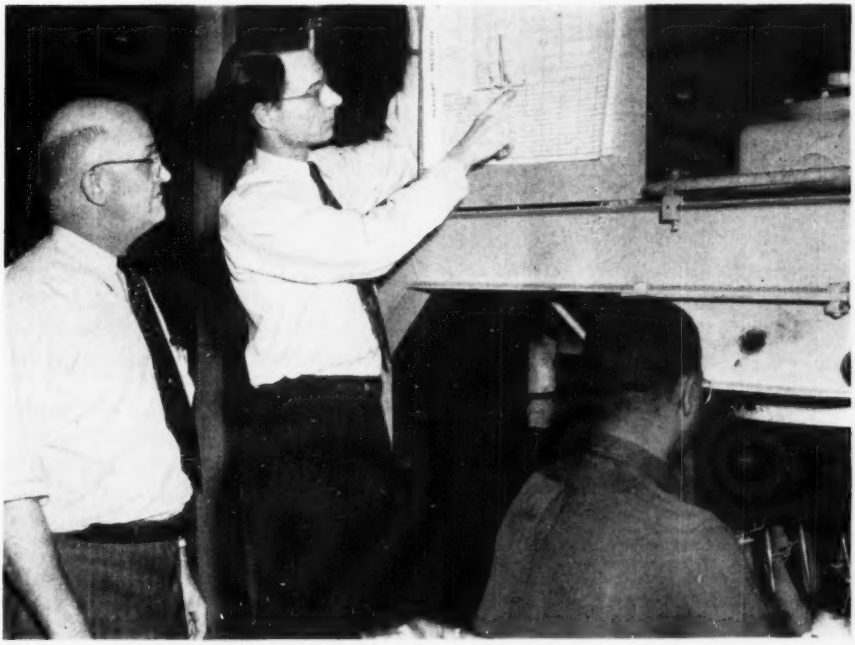
The chromium plated, barbed picking spindles are deft mechanical fingers which efficiently extract the lint from the open cotton bolls without damage to the plants.

*(Photo courtesy International Harvester Company, Evansville Works, Evansville, Indiana)*

# Improves Efficiency of Operation

vertically-mounted picker bars, each containing 20 horizontally-mounted, chromium plated spindles. Thus there are 600 picking spindles in the machine. Each spindle has numerous small projecting barbs which catch the lint of the open bolls and quickly extract it as the machine moves down the row. The spindles travel in a cam-actuated oval-shaped path to eliminate raking action. The

E. L. Lorenzen, plating foreman, points to the quality control chart to explain to R. R. Nelson, quality control supervisor, the latest "trend" of work. As can be noted, the chart is mounted on the fully automatic chromium plating machine at the loading and unloading station.
*(Photo courtesy International Harvester Company, Evansville Works, Evansville, Indiana)*



properly spaced spindles are driven by individual gears, the rotating speed of which is synchronized with the forward travel of the machine—2,000 r.p.m. at 2 m.p.h. and 2,700 r.p.m. at 2¾ m.p.h.

A spindle-moistening system keeps the spindles moist to aid in extracting the lint from open bolls and to aid rubber doffers in removing the lint from the spindles.

As the machine moves down the row each plant is guided into the picking unit by gatherers and plant lifters. Compressor sheets hold the plant in the path of the spindles, so that it comes in contact with the spindles of the front drum and later with the spindles of the back drum. Thus, the plant is picked thoroughly on both sides of the row.

Fig. 1—Close-up view of the loading and unloading station showing the conveyor and cathode fixtures which hold the spindles. Unplated parts are stored to the rear of the operator; the plated parts are inserted in special racks, one of which may be seen in the foreground on the roller conveyor. A red light, which remains lighted as long as plating current is flowing, is located on the machine at the eye level of the operator and just slightly to his right.
*(Photo courtesy International Harvester Company, Evansville Works, Evansville, Indiana)*

Each of the spindles has 72 projecting barbs which catch the lint of the open cotton bolls and extract it. To resist abrasive action between the cotton bolls and the spindles, rotating at high speed, the spindles are chromium plated.

**Process and Equipment**

Spindles are machined and barbs cut into them by a special machine designed especially for the job by International Harvester engineers. The spindles next move to the heat treating department in tote boxes. There they are case hardened to a depth of approximately 0.012 inch.

By means of tote boxes, spindles are next moved to the adjacent plating department in which are three fully automatic plating machines. Approximately 15,500 picker spindles are hard chromium plated per day (three shifts), using one fully automatic plating machine (see Fig. 1). It is of interest to note that this production rate is twice as high as the rate for which the setup was designed. The unit has operated on a 24-hour-per-day basis for five years without a major breakdown.

Only one man is needed for loading and unloading the machine. Chromium is deposited to a thickness of 0.0004 to 0.0006 inch by the following process:

1. Clean in caustic cleaner, held at a concentration of 10 oz./gal. and a temperature of 185 deg. F. Reverse current from a 6 volt rectifier is used.

2. Rinse in cold water.
3. Pickle with reverse current (6 volts) in 50 per cent (by volume) muriatic acid.
4. Spray rinse with cold water. Eight water jets are trained on each spindle as it passes over the center of the tank.
5. Etch with reverse current in chromic acid solution held at 160 deg. F. and made up at the same concentration as plating bath. Supply voltage is 6 volts.
6. Chromium plate at 3,000 amperes and 6 volts for approximately 21 minutes. No masking is necessary because height of deposit is controlled by solution level in tank. Anode to cathode spacing is 7½ inches.
7. Rinse with water spray as spindles emerge from chrome plating bath. Two jets are used at this station.
8. Rinse in cold water.
9. Rinse in cold water.
10. Rinse in hot water at a temperature of 190 deg. F.
11. Dry with hot air at approximately 158 deg. F.
12. Unload and load (see Fig. 1).

Spindles are carried in simple, Y-shaped, positive-contact, wire fixtures which allow quick loading and unloading (see Fig. 1), yet provide good contact. These fixtures are attached to the plating conveyor which carries them through the plating cycle at a rate of 3.57 feet per minute.

The solution used for the chromic acid etch and chromium plating is as follows:

Chromic acid—33 oz./gal.
Sulfuric acid—0.33 oz./gal.

The correct solution level in the plating tank is automatically controlled by an electronic level control (see Fig. 2). It controls the flow of deionized water into the plating tank from a deionizer.

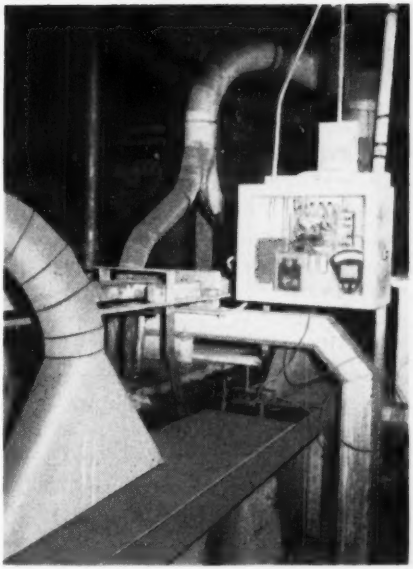


Fig. 2—A view of the first section of the chromium plating tank, showing the electronic solution level control which automatically keeps the plating solution at the correct height.
*(PRODUCTS FINISHING Staff Photo)*

The deionizer has a capacity of 40 g.p.h. and is located on the same side of the plating machine as the controller (see Fig. 3). Besides feeding the plating tank through the controller, it provides water for the two water sprays at the end of the plating tank.

All tanks of the plating machine are of steel; those containing acids are lead lined and the tank holding the electrolytic pickle is rubber lined. Solutions are heated by steam coils, with those in the chromic acid baths being made of lead and the rest being wrought iron. Vapors from all hot

baths are drawn through lined exhaust hoods which connect to 4 cumulative stacks leading to exhaust fans.

**Application of Statistical Quality Control**

The complete plating process is controlled through visual inspection of 100 samples each hour. This sample number was used when control was first applied and is still used today for convenience purposes in calculating the percentage of rejected parts. Prior to the use of quality control, 100 per cent inspection was used, or the inspector checked 642 pieces each hour.

The 100 samples are picked at random out of the lot produced during an hour and inspected for the following possible defects:

1. Not clean.
2. Etched.
3. Pitted.
4. Peeled.
5. Dead rack (no deposit).
6. Stain.
7. Rusty.
8. Plating thickness.

The results of the inspection are plotted on a chart (see Figs. 4 and 5) which is located adjacent to the plating machine, as shown in the article heading. The per cent defective, that is, the number of defective parts divided by the sample number[1], which is 100, is plotted, a different color being used for each shift of workers.

The quality control limit on this process is 2 per cent. Any batch of one hour's work having a greater percentage is set aside for 100 per cent inspection and rework. The speed of the conveyor on the plating machine, which controls the thickness of the deposit, is checked once a day.

Figure 4 is a reproduction of one of the earliest charts that resulted when Statistical Quality Control was first introduced. The chart shows a greatly varying percentage of defects, the overall average being 5.00 per cent defective at that time. Prominent peaks show that certain factors and conditions caused rejects far above what was the average.

[1] See page 25, March 1953 issue of PRODUCTS FINISHING.

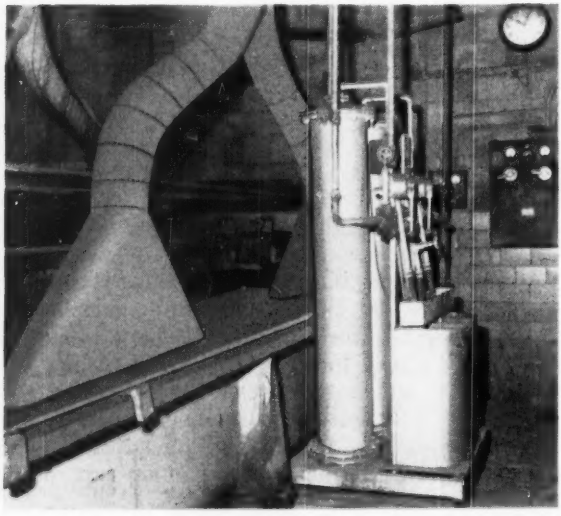


Fig. 3—The deionizer which is located on the same side of the fully automatic plating machine as the electronic solution level control. Pipes from this deionizer lead to the electronic control and to the jets which rinse the spindles as they emerge from the plating bath. *(PRODUCTS FINISHING Staff Photo)*

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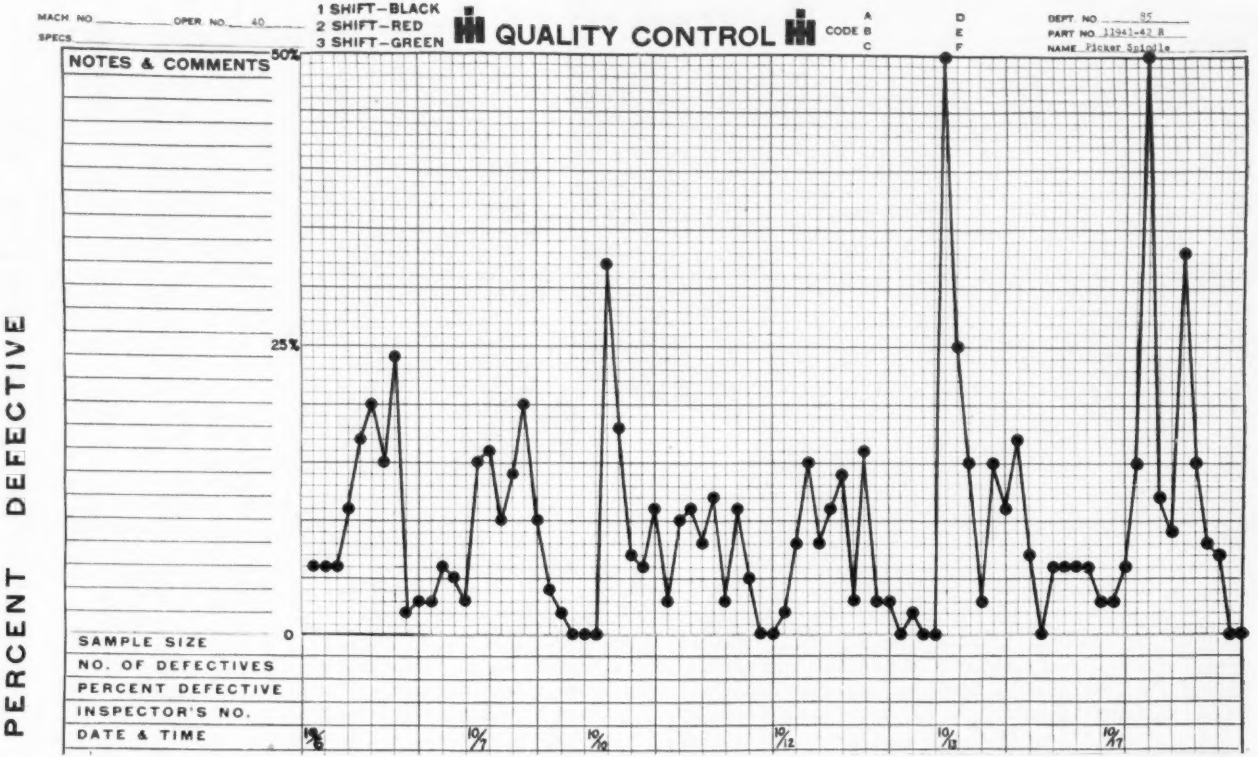
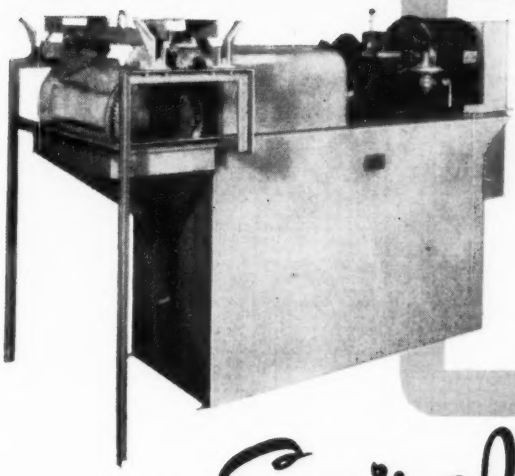



Fig. 4—Reproduction of the "Per Cent Defective" chart plotted when Statistical Quality Control was first put into operation. Note the erratic trend of this chart, showing that many factors caused a large number of rejects. A great amount of rework was thus caused since no imperfect spindles are used by the company. As shown at the top of the chart, the three shifts are identified on the original graph by three different colors.
*(Drawing courtesy International Harvester Company, Evansville Works, Evansville, Indiana)*



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| **Drum Size:** | 22" Diameter—72" long—9" screw |
| **Drum Perforations:** | ⅛" (other sizes available) |
| **Drum Speed:** | 3½ R.P.M.—2 R.P.M.—1.1 R.P.M. |
| **Drying Time:** | 1.8 min.—3 min.—6½ min. |
| **Production:** | 450 to 1600 quarts per hour (60 to 213 cu. ft.) |
| **Drive:** | ¾ H.P.—220/440 v., 3 phase, 60 cycle |
| **Discharge Chute:** | 20" from floor (minimum)* |
| **Loading Chute:** | 42" from floor (minimum) |
| **Heater:** | Gas—250,000 B.T.U. complete with spark ignition, safety shutoff valve, pilot solenoid and pressure regulator. A flame-protecto-relay with flame rod and rectifier head is furnished for flame failure protection. Dryer also available with steam blast coils and blower. |

*Can be arranged for any height from tote pan to 55-gal. drum.

- No matter how intricate the design, recesses or contours of the parts, the 3-speed spiral through this hot air blast will completely dry up to 1600 quarts an hour — AUTOMATICALLY!
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Figure 5 is the chart plotted just shortly before the time the writer visited this department. Overall average of defects had been reduced to 0.25 per cent or a reduction in defective parts of 95 per cent. At the beginning

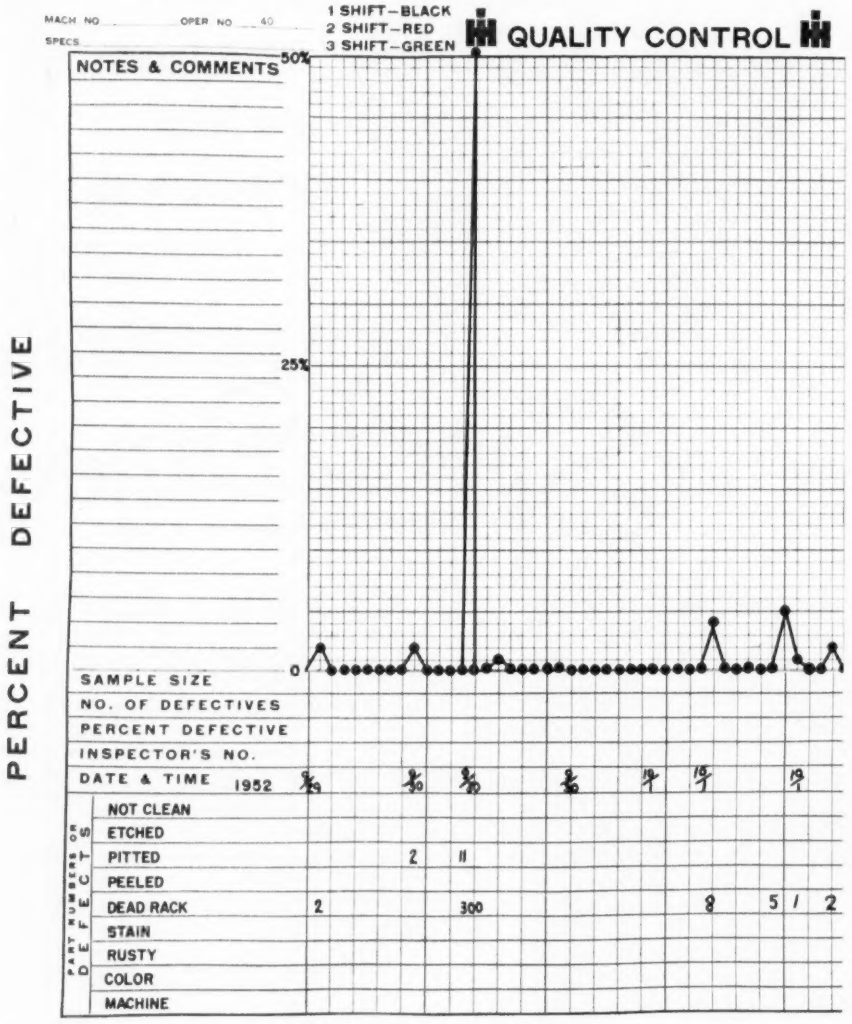


Fig. 5—Reproduction of the "Per Cent Defective" chart plotted shortly before the author visited the plant. Note that frequently zero per cent defective was found, that the majority of the samples of 100 had 2 or less per cent defective, and the lot was therefore acceptable. When troubles did arise, they were pin pointed and speedily remedied.

*(Drawing courtesy International Harvester Company, Evansville Works, Evansville, Indiana)*

how can this
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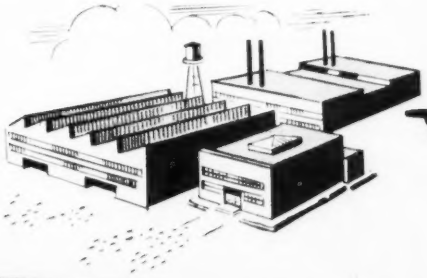
produce as many
metal parts...



as this
**LARGE**
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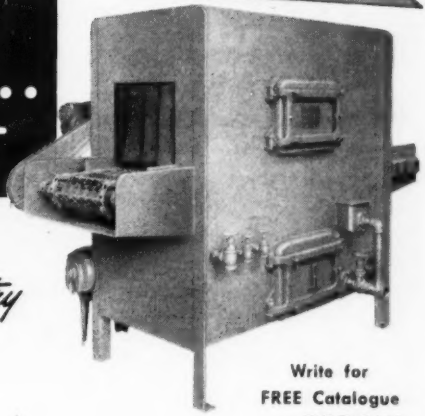

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of the shift for which this particular chart was started (extreme left hand margin), the process was "under control" with no rejects being greater in number than two out of one hundred. However, the 7th hour of the third shift produced 50 per cent defective parts, which was mainly due to failure of current to plating racks as the analysis of causes for rejection at the bottom of the chart shows. It should be noted that this cause for bad plating had been remedied by the next hour, thus saving many additional rejects. When plating with certain types of automatic machines, circuit breaks are not immediately apparent unless there is 100 per cent inspection. To indicate a complete circuit break, a red signal light was installed at the loading and unloading operator's station. Thus, should the red light go out indicating no current flow, the operator can immediately stop the machine's conveyor and initiate action to remedy this cause.

Benefits to this plating operation through the use of Statistical Quality Control have been many, according to E. L. Lorenzen, plating foreman, and R. R. Nelson, quality control supervisor. The sample size of 100 spindles instead of the 642, which were checked under 100 per cent inspection, has allowed the inspector to be free for work elsewhere. Also, inspection has been better since a smaller number of samples considerably reduced the monotony of the work, and thereby reduced fatigue. Thus, the real goal of inspection is achieved since the inspector will carefully check each sample.

In regard to solutions, the charts provide an excellent method of con-

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**IF PAINT ADHERENCE IS IMPORTANT...** you'll find Iridite prevents underfilm corrosion and soap formation.

## OR, FOR BRIGHT, DECORATIVE FINISHES—

investigate zinc plate and Iridite (Bright) for a chrome-like decorative finish with more corrosion protection than conventional chrome plating . . . or Iridite (Metcote) as a treatment for copper that eliminates the need for buffing in the copper-chrome system; produces a sparkling bright finish!

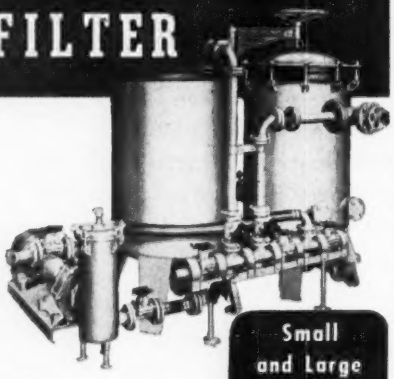
**Write for literature and send us samples for test processing. See "Plating Supplies" in your classified telephone directory or write direct.**

**Iridite is approved under government specifications.**

**ALLIED RESEARCH PRODUCTS**
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

**Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals; ARP Plating Brighteners.**
**West Coast Licensee: J. H. BYCROFT COMPANY**

For Solution Clarification
*Use an*
INDUSTRIAL
FILTER



Small and Large Capacities

The flow rate of an INDUSTRIAL filter is based on the actual solution involved. You know the capacity you get. Furthermore, the labor, down time, and the inconveniences of cleaning, replacing the filter media, and reassembling the filter for every filtering cycle—all are eliminated by the Industrial Air-Wash Cleaning Method available for all models. It is necessary to remove the cover only when new filter cloths are installed. With Industrial filters, a clarified solution is always assured.

The engineering, design, and construction of Industrial Filters have proved out in long service and low maintenance costs Industrial has the experience and is large enough to handle your filter requirements. Since 1927 filters and filtration systems have been an important part of our business.

★ ***Write for recommendations***

**INDUSTRIAL FILTER & PUMP MFG. CO.**

5904 Ogden Avenue Chicago 50, Illinois

trolling additions of chemicals. They foretell when concentrations are becoming low before the time when additions have to be made. Thus, cause for rejection due to low chemical concentration is virtually eliminated.

Besides predicting and foreseeing other troubles in the plating operation, such as poor rinsing, the charts have helped greatly in training new personnel in the characteristics of the setup. They have also helped to a great extent in answering the "why" of rejected parts, a knowledge which gives operating personnel a greater insight into the plating process and a greater incentive to help control the process so that fewer rejects will occur. Perhaps of even greater importance, it showed personnel associated with the department just what could be done quality-wise. In the finishing of these spindles, a product that is quality inspected for the job, the charts established a visual quality production peak. They made all persons connected with the operation much more aware of process control for better parts.

Finally, it helped management by showing what caused rejects, thus giving it a point of attack in the campaign for a continuously smaller percentage defective.

---

The addition of a small percentage of the element tellurium doubles the strength of lead, as well as increases its resistance to vibration, heat and corrosion.

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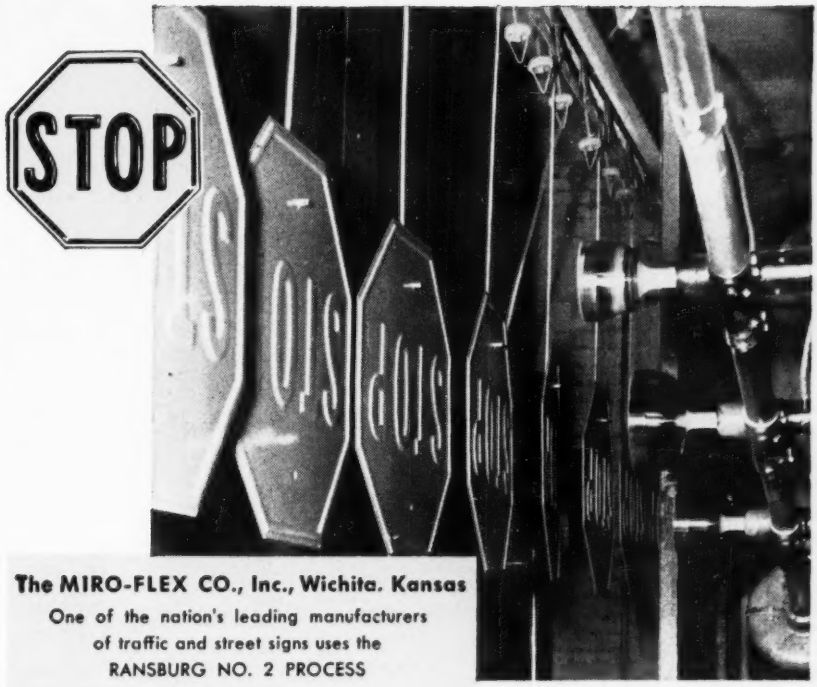
Canada's contribution to the overwhelming superiority of the free world in the field of nickel is marked by the fact that Canadian annual production is five times the amount estimated for Russia.




**The MIRO-FLEX CO., Inc., Wichita, Kansas**
One of the nation's leading manufacturers
of traffic and street signs uses the
RANSBURG NO. 2 PROCESS

## PRODUCTION IS NEARLY TRIPLED and FINISHING COSTS ARE CUT 47% with Ransburg NO. 2 PROCESS

Miro-Flex—with hand spray—used to finish 90 signs per hour. Now, with the Ransburg No. 2 Process, production has jumped to 250 units per hour. Overall net saving in finishing cost is 47%—largely due to a 40% increase in paint mileage. And, they are getting a more uniform coating—with NO REJECTS.

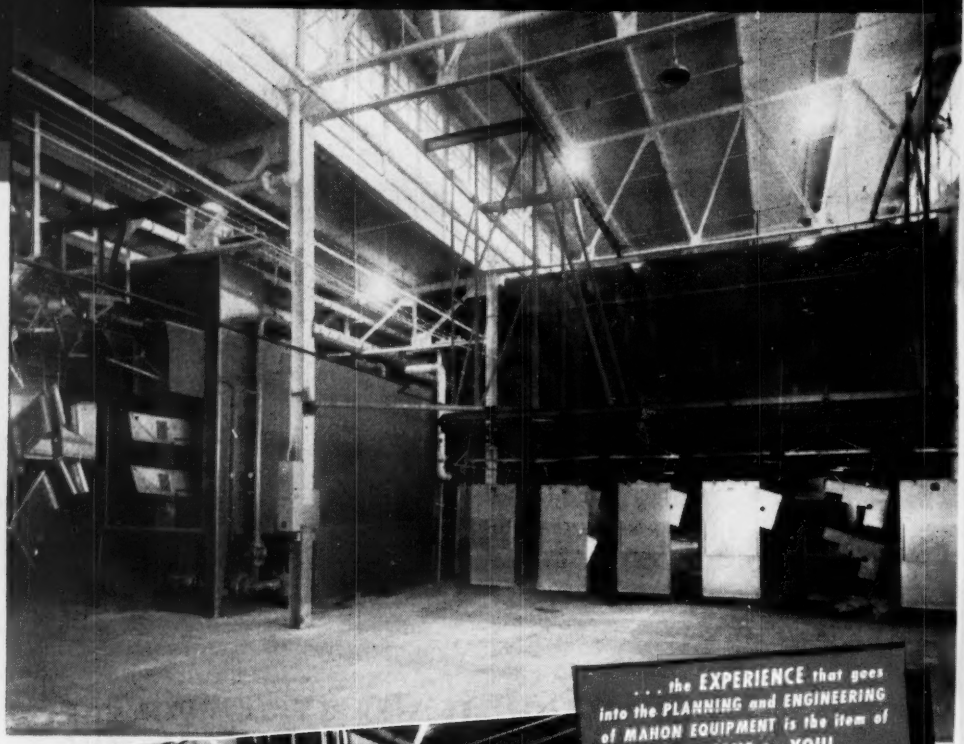
This is another on-the-job example of what Ransburg No. 2 Process is doing on production lines all over the country. If you want to know more about the Ransburg No. 2 Process, write for our brochure containing data and detailed information on various installations.

**RANSBURG ELECTRO-COATING CORP.**

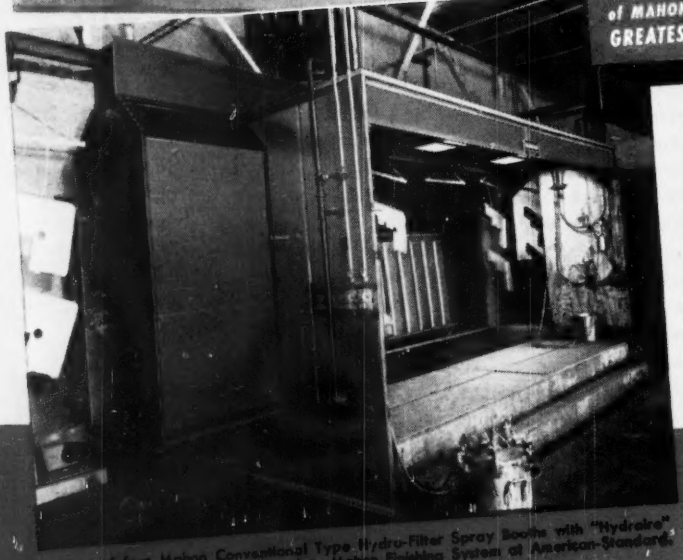
**Indianapolis 7, Indiana**

RANSBURG

# COMPLET



. . . the **EXPERIENCE** that goes into the **PLANNING** and **ENGINEERING** of **MAHON EQUIPMENT** is the item of **GREATEST VALUE** to **YOU!**



One of four Mahon Conventional Type Hydru-Filter Spray Booths with "Hydraire" Flood Sheet—part of the Complete Mahon Finishing System at American-Standard.

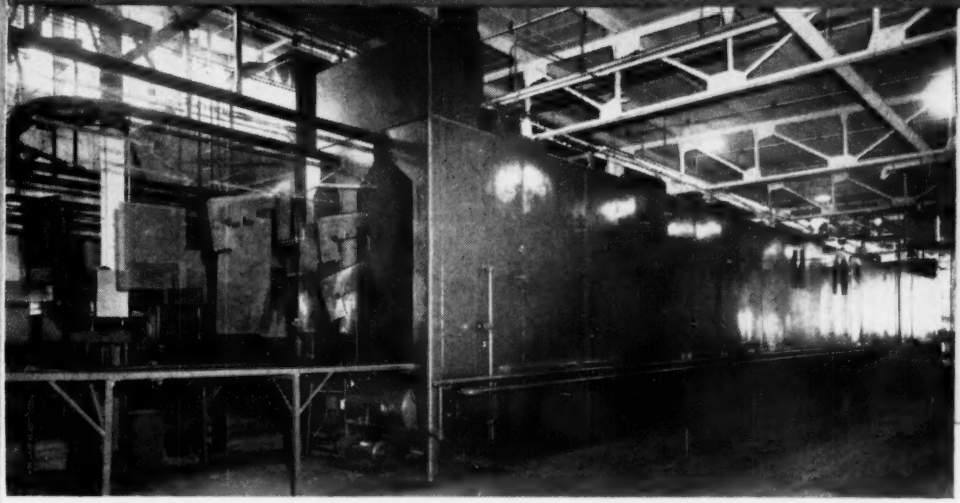
Above at Right you see the Mahon Metal Cleaning and Rust Proofing Machine at American-Standard. Note that two parallel conveyor lines carry parts through a single processing tunnel. Above, the entrance end of the Cleaning and Rust Proofing Machine is shown together with the Overhead, Bottom Entrance, Combination Drying and Finish Baking Oven. Separate Heating Units and Automatic Temperature Controls maintain specific temperatures in both Drying and Finish Baking Sections of the Combined Oven.

M

E

# Finishing SYSTEMS

## . . . for ENAMELS • LACQUER • PAINT • VARNISH



### *AMERICAN-STANDARD Heating and Cooling Units Receive Their FINE FINISH in MAHON EQUIPMENT!*

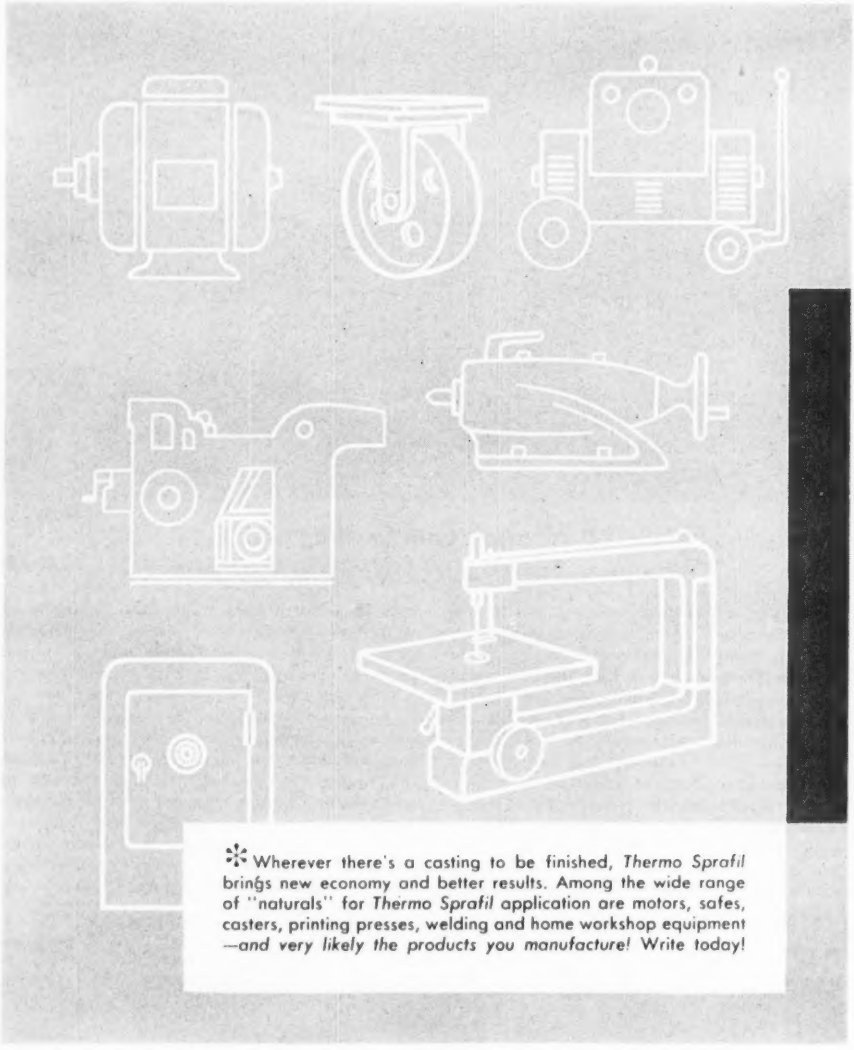
Illustrated here are major elements of one of two Complete Finishing Systems recently installed by Mahon in the Buffalo Stamping Plant of American-Standard. In this particular system, which is ultra-modern in every respect, jackets and other metal parts of residential heating and cooling units are carried through the entire system on two parallel conveyor lines. Metal Cleaning and Rust Proofing is accomplished on the two conveyor lines in a single processing tunnel. The two parallel conveyor lines then carry parts through an overhead, bottom entrance, single-pass Dry-Off Oven which is an integral part of the Finish Baking Oven. Parts on each of the conveyor lines then pass through two conventional type Hydro-Filter Spray Booths, staggered right and left hand, where the finish is applied. Finish is baked while the two parallel conveyors make a double-pass circuit in the finish baking section of the overhead oven. This is a typical Mahon engineered Finishing System. If you are contemplating new finishing equipment, you too, will find that Mahon engineers are better qualified to do the all-important planning and engineering which is the key to fine finishes at minimum cost . . . and you will also find Mahon equipment more economical to operate over a longer period of time. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-653.

**THE R. C. MAHON COMPANY • Detroit 34, Michigan • Chicago 4, Illinois**

Engineers and Manufacturers of Metal Cleaning, Pickling and Phosphating Equipment, Spray Booths, Flow and Dip Coaters, Drying and Baking Ovens, and Complete Conveyorized Production Finishing Systems.

# AHON

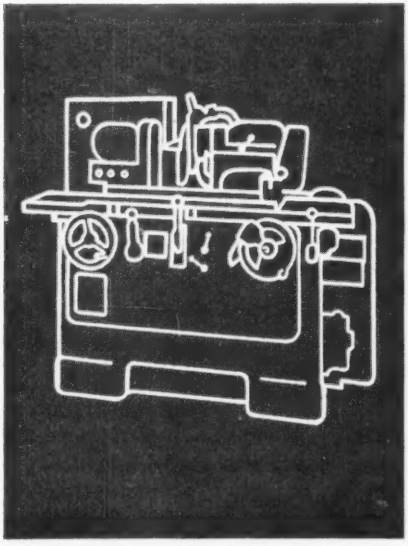
# Lowe Brothers THERMO SPRAFIL®
# 20% of Manufacturer's



✻ Wherever there's a casting to be finished, *Thermo Sprafil* brings new economy and better results. Among the wide range of "naturals" for *Thermo Sprafil* application are motors, safes, casters, printing presses, welding and home workshop equipment —*and very likely the products you manufacture!* Write today!

# Finishing System Saves Production Time!

When this large manufacturer of grinders installed *Thermo Sprafil* at the suggestion of a Lowe Brothers "Finishing Specialist," he expected to see *some* savings in production time—but nothing like the 15% to 20% that actually resulted in the initial tests. Now, this manufacturer anticipates even *greater* savings as his production people learn to make fullest use of *Thermo Sprafil's time-saving* advantages!



*This advertisement is based on facts taken from Lowe Brothers Industrial Case History Files.*

How did *Thermo Sprafil* save so much production time in this plant? Here are the four reasons, plain and simple:

**1.** *Thermo Sprafil* reduced sanding—entirely eliminated need for sanding on smaller castings—sanded very easily where necessary at all.

**2.** *Thermo Sprafil* permitted straight-line, *non-stop* production and finishing—no costly delays for tedious filling operations. Higher solids content of *Thermo Sprafil* resulted in greater "build" for successful one-pass spray application.

**3.** Much less handling of castings—they stayed on the line and moved! *Thermo Sprafil* dried quickly—ready for the next operation in a few hours.

**4.** Less time consumed in actual application of the finish. *Thermo Sprafil* flowed on smoothly—no "pin-holing."

All down the line, *Thermo Sprafil* saved time for this manufacturer—and time is *money* on any production job. Take time now to check into *Thermo Sprafil* for *your* operation, and join the many other manufacturers who are enjoying faster production and better finishing results *at lower cost*. Get the full story from a Lowe Brothers "Finishing Specialist." Write today.

**THE LOWE BROTHERS COMPANY • Dayton 2, Ohio**
**Industrial Division**

LEADERSHIP THROUGH CONSISTENT SERVICE

**Lowe Brothers**
**FINISHES FOR INDUSTRY**

# Finishing Clinic

In this department are presented some of the questions submitted by readers together with suggested solutions of the problems outlined.

**Question.** *We are in the jewelry manufacturing business and have a plating problem. When we find it necessary to increase some of the dimensions of various parts of a ring mounting, we have been doing this by electroplating. We had been using a copper plate but found this unsatisfactory, due to peeling when the ring was filed, and the inability to stand heat. We are now using a silver cyanide bath from which we get a smooth plate 0.005 to 0.030 inches thick. The plate adheres well unless we find it necessary to heat the ring for soldering. Upon heating we obtain blisters and lack of adherence. We are looking for a plate which may be deposited on the following metals: 14 Karat yellow gold, 14 Karat white gold, silver, nickel silver, copper. We would like to plate with palladium, silver or copper, and would prefer to use the metal which would offer the best plate with respect to smoothness, adherence and ability to stand hard soldering.*

*M. C. P.*

**Answer.** Lack of adherence of an electroplate on a base metal normally results from two causes; namely, either the metal has not been cleaned properly, or some intermediate plate or treatment has been omitted.

In order to be able to determine with any degree of satisfaction the cause of your trouble, it is desirable for a technical service man from one of the several electroplating supply companies to observe your plating prosess, following it step by step, analyzing each solution used, and generally making a thorough study of your process from one end to the other. In case you wish to contact the New York repre-

sentatives of some of the leading plating supply companies we should like to refer you to (names of a number of companies furnished).

Inasmuch as your plating is concerned with precious metals rather than the more usual commercially plated metals, you might like to consult a number of companies who market precious metal plating solutions. Some of these are as follows: (names of a number of companies given).

In the event that you wish to engage one of the many electroplating consultants in the New York area, you will find a number of these listed in the classified telephone directory.

———— *fc* ————

**Question:** *We are attempting to nickel plate a screw machined part made from leaded brass stock and have had considerable difficulty getting good coverage of nickel. There seem to be bare spots where the nickel has not plated, and also some peeling where the plate may have bridged over such a bad spot.*

*Our procedure is to bright dip in a nitric-sulfuric dip, cathodic clean, water rinse, dip in 10 per cent HC1, water rinse, and plate in a standard Watts bath.*

*The parts seem free of water break but perhaps our sequence is wrong. Can you suggest a proper cleaning sequence for leaded brass prior to nickel plate?*

V. W. W.

**Answer:** In connection with the process sequence which you use, two points might be considered. The first is that the cathodic cleaning operation should be performed as quickly as possible and in a suitable electrocleaner. Therefore, you might like to consider a combination of vapor degreasing and cathodic cleaning, emulsion cleaning and cathodic cleaning, or alkali soak cleaning with a very short cathodic cleaning period. The cleaning compound sales representative who calls on you can discuss these methods and applications in great detail.

In the second place, most platers have found it easier to secure adherence of nickel to brass or steel parts if a cyanide copper strike is used as an intermediate operation in the process. In this case the revised sequence of operations would be as follows:

1. Bright dip in nitric-sulfuric acid.
2. Clean (by whatever process desired).
3. Water rinse.
4. Dip in 10 per cent muriatic acid.
5. Water rinse.
6. Copper strike.
7. Water rinse.
8. Dip in 3 per cent sulfuric acid (Preferable to 10 per cent muriatic acid, although not mandatory.
9. Water rinse.
10. Nickel plate.

Obviously the revised process requires more time and effort than the process you are now using. Since the proof of all plating processes may be found in the results obtained, you might profitably conduct some laboratory scale or pilot plant scale experiments to see whether or not the copper strike prior to nickel plating would prove beneficial.

**DO YOU HAVE A FINISHING PROBLEM?**

The editorial staff of PRODUCTS FINISHING is prepared to aid you in the solution of your problem.

There is no charge for this service.

# Stripping and Refinishing Aluminum

(Above) A DC-3 executive transport airplane after stripping, cleaning and repainting in two shades of green, and white in the AiResearch Aviation Service shops.

By ADRIAN VOORHEES
Foreman, Paint Department
AiResearch Aviation Service Company

OUR job here at AiResearch Aviation Service Company located on International Airport, Los Angeles, is to make old airplanes look and operate like new airplanes. Our overall endeavor is geared to this effort. While we do accomplish a lot of overhaul and repair work, our pride is concentrated on the aircraft which have entered one of our three big hangars looking like "sad sack" assemblies of tin and iron, and have left a few weeks later bearing all the beauty, grace, and dependable operating qualities inherent in a "queen of the skies."

In any reconversion job, we know that we must deliver an airplane that is as operationally perfect as it is possible to make it. But we know also that appearance, not operational qualities, is the one feature of the job that first greets our customer's eyes. A great deal depends on this first impression.

At this point, we are aware of another fact which only an experienced finisher will appreciate. We know that if we turn out a well-finished airplane with a surface finish highly resistant to corrosion, abrasion, and weathering, this finish, in addition to appearance, will possess the quality to provide excellent protection for the operational qualities our shops have built into the aircraft.

Knowing that a good finish serves this double purpose—appearance and protection—we have not stinted in our research into the matter. We firmly believe we are using the best methods and materials available today. If we thought there was a better method or

# Aircraft Surfaces

material, we would adopt it immediately. And I might say right here that our processes are not limited to the huge proportions of stripping and brightening or repainting an entire airplane. Reduced in scope, they could be made to serve the requirements of any shop needing to accomplish the same type of work.

We are faced with one of two general finishing problems when an airplane enters our shops.

1. If the airplane has never been previously painted, the customer may ask us to brighten the surface, or to apply a paint finish.
2. If the airplane has been painted, we may be asked for a new paint job; or we may be asked to remove the old paint and brighten the aluminum surface into a shiny bare metal finish.

To meet these demands, we have developed four basic processes which may be used singly or in combination to meet the various customer demands. These processes are:

1. Stripping
2. Etching
3. Priming and painting
4. Brightening

How one of these processes must fol-

Fig. 1—Using steam and water rinse to remove old paint previously softened by the stripper. This operation is performed on an outdoor apron. In general, the entire airplane surface is stripped at one time, except for small, removable parts such as shown here, which are easier to strip and refinish individually.

low another to attain a certain result is self evident. Therefore, for the sake of clarity, each will be described separately.

### Stripping

All airplanes which have been previously painted must have the old paint removed before any action toward refinishing can be taken. This stripping job must be thorough. Any remaining old finish is bound to affect the quality of the new finish, both as to adherence and appearance. The complexity of the stripping job depends upon the condition and type of the old coating. If it is in poor condition, peeling and loose, it comes off quite easily. If it is in good condition, it is somewhat harder to remove. Also, old enamel finishes are much easier to strip than old lacquer finishes.

In our operations, most of which involve the stripping of the finish from an entire airplane, we use a special paint stripping material. This formula is applied to the aircraft surfaces through a "T" jet nozzle, operated from a 30 gallon pressure pot under 50 to 60 p.s.i. pressure. It should be noted here that a special type hose is needed for this material. We use "Goodyear Emerald Green," a neoprene-base hose material that is entirely resistant to the chemical.

The chemical is allowed to act upon the old coating for from ½ to ¾ hour (dependent upon the condition of the old coating) before further action. During this period, in most cases, the old paint will become sufficiently soft to be hosed away with cold water. But when we strike a difficult area where cold water cannot remove the softened coating, we use a steam jet. This

F.g. 2—Repainting a flying boat after stripping, cleaning and priming. Note copious masking used to protect transparent acrylic enclosures, engines, propellers, and other parts which will be painted a different color from the one being applied at the time.

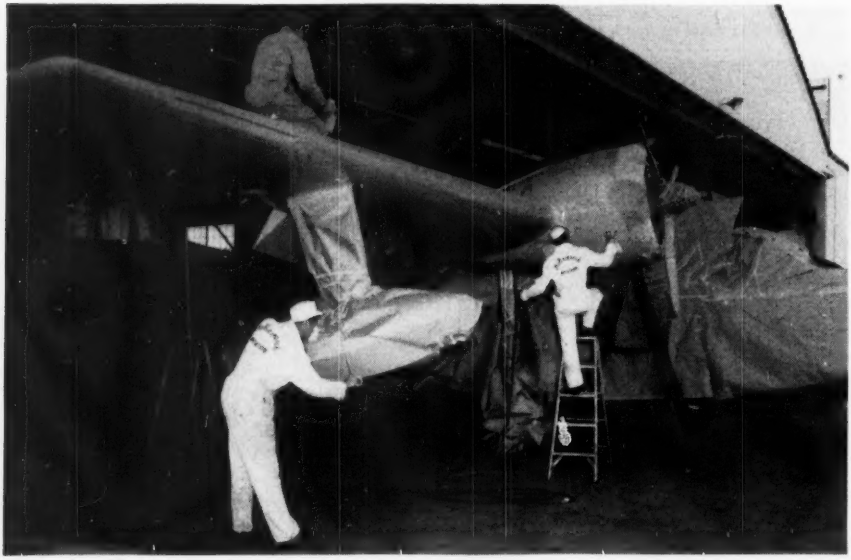


Fig. 3—A DC-3 executive transport that was stripped, cleaned, surface buffed, then brightened. The only painted parts on this fuselage are window trim and lettering.

work is accomplished outdoors on a concrete ramp. We never allow the stripper to thoroughly dry on a surface before it is hosed away.

After this general stripping, we go over the entire airplane, spot cleaning where necessary with the same stripping compound. Rubber gloves must be used when this material is applied by hand. After spot cleaning, the entire airplane is wiped down with acetone to assure removal of all traces of stripping compound, and to produce a chemically clean surface.

During stripping, all fabric covered areas and all transparent acrylic plastic areas must be masked off. This masking must be very thorough over the transparent acrylics (windows, windshields, and so on) because the stripping chemical reacts violently with these materials, and will destroy a window or windshield very quickly.

### Etching

If an airplane is to be painted after stripping, a good etched surface is necessary to provide a bond for the primer and paint coatings. While etching is not a critical process, it should be accomplished in a manner to assure etching of all surfaces. The etch accomplishes two prime purposes—first, it roughens the surface microscopically just enough to provide a mechanical bond for the subsequent primer coating, and secondly, it insures a chemically clean surface.

In our shops, we use Turco's WO-1 etchant, a phosphoric acid wash which provides an optimum degree of etch while at the same time imparting a good degree of corrosion resistance. The phosphate coating formed on the aluminum by action of the etchant acts as a corrosion inhibitor. We have found that phosphoric acid etchants are dependable and not liable to spot-etch. There is a marked dulling of the aluminum luster as the phosphoric acid etchant accomplishes its work.

After etching, the entire surface of the airplane is given a thorough cold water rinse, then allowed to dry. The prime coating should be applied as soon as possible after etching to avoid the possibility of surface contamination. Here again, we never allow the etching solution to thoroughly dry before it is rinsed away.

### Brightening

As already noted, surface brightening of the aluminum sheeting comprising the body of an airplane presents one of two problems—brightening aluminum that has never been painted, and brightening of aluminum

that has previously been etched, primed and painted. The previously painted material requires several treatments prior to the final brightening treatment, after which the procedure in both cases is the same.

Painted aluminum must, of course, be first stripped and cleaned. The next step is to "iron out" the slight roughness produced by the previous etch. In our shops, this is accomplished by thoroughly buffing the surface using Red-4 powder on a power buffing wheel with a wool pad. Buffing must continue until it is evident the surface is smooth enough to give a high luster once it is properly treated.

In the actual brightening operation, we use "Alutone." This chemical is applied over about half of the airplane at a time using a "T" jet spray nozzle operating from a 50 to 60 p.s.i. pressure pot. After application of the brightener, the surfaces are not touched for about 30 minutes. There is no appreciable drying out of the chemical during this period.

After this "setting" period, soft bristle brushes are used to scrub all surfaces on which the "Alutone" has been applied. This scrubbing continues until the chemical foams, or works into a good lather. The lather is then washed away with a cold water rinse, leaving a very bright and lustrous aluminum surface.

**Priming and Painting**

When an airplane must be painted, it is primed as soon as possible after etching. We employ and have found very satisfactory a metal etching primer available from the W. P. Fuller Company. This material comes in 3 units—zinc chromate paste, reducer and accelerator—and is mixed just prior to use. Volumetric measurement is used in mixing, with the proportions being 4 parts zinc chromate paste, 2 parts reducer, and 1 part accelerator. After mixing, no agitation is required to prevent separation unless the material sets for several hours (overnight, for instance). This primer is a vinyl base material, and is waterproof in quality, thus overcoming a major objection to straight zinc chromate priming material. This same waterproof quality effectively prevents the infiltration of moisture under adjacent areas of paint when a surface rupture

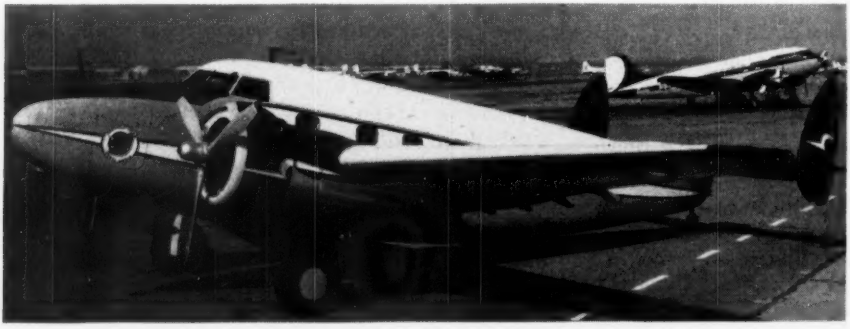
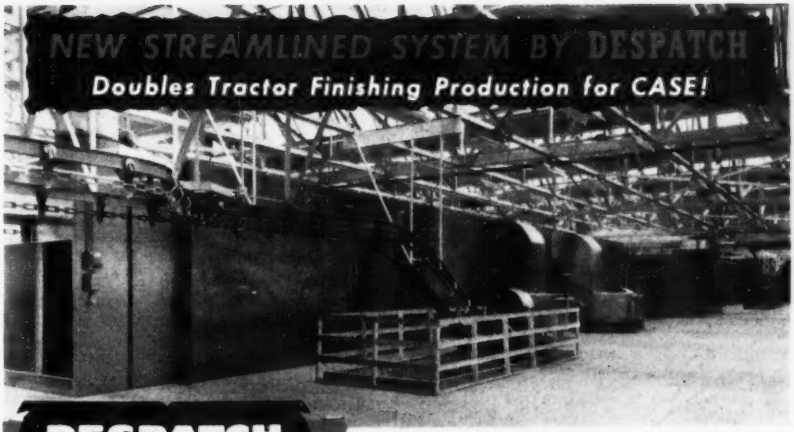
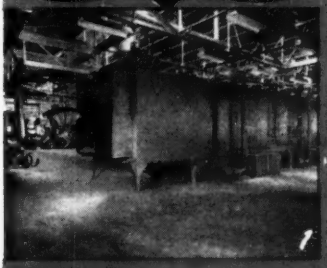
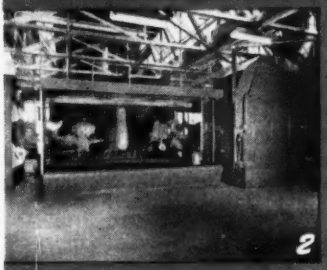


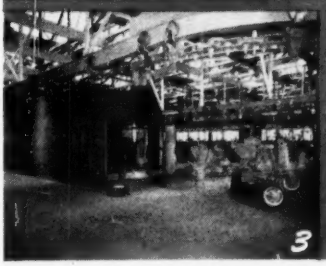
**Fig. 4—Aircraft coatings often need to serve a double purpose—protection and insulation from heat. This executive airplane will be used in the tropics, and is therefore painted white on top to reflect rather than absorb the intense heat of the tropical sun.**
***(All photos by AiResearch Aviation Service Company, Los Angeles, Calif.)***




DESPATCH




## A FINISHED TRACTOR *every 5 minutes!*

Tractor finishing at the J. I. Case plant, Rock Island, Ill., has been doubled and quality of finish raised to a new high with this modern finishing system designed, built and installed by Despatch. Housed in a new, well lighted building the system is giving Case tractors a rich, durable baked on finish in the familiar Case Flambeau Red. The operation includes washing, painting and finish baking.

1. 600-ft. continuous conveyor enters 3-stage washer where tractor gets a 160° F. phosphate wash, cold water mist bath, and 180° F. hot water rinse.
2. Tractors are spray painted in staggered water wash booths. Paint is heated to 170° F. —eliminates need for thinner and allows closer spraying to cut down overspray.
3. A lasting, weather resistant finish is baked on at 225° F. in this 96-ft. oven heated by steam from the Case central steam plant. Emerging from the oven, tires and other accessories are added.

**Let Despatch Modernize Your Finishing Operations**

Replace your obsolete finishing system with a modern Despatch system engineered to fit your needs. Increased production, higher quality and lower costs will result.

*Write, wire or call Dept. C for details.*

DESPATCH OVEN COMPANY

Minneapolis Office: 619 S. E. 8th Street

Chicago Office: 4554 N. Broadway

Sales Offices in all Principal Cities

such as a scratch occurs after the job is finished. This primer should be used only when a synthetic enamel will be used for final finishing. Conventional zinc chromate primer must be used under lacquer finishes.

This primer dries in about five minutes. After it is dry, the primed area is scuff sanded with No. 400 wet-or-dry sandpaper (used dry), then wiped off with a tack rag. The surface is then ready for paint.

Our painting techniques are conventional, and suffice it to say at this point that we use only first line finishes for the work. A cheaper material of less quality would be only anticlimax to our careful surface preparation techniques.

Although not many plants are engaged in stripping and brightening or repainting airplanes, still there are hundreds of aluminum products now in use on which these processes could be employed to obtain results equal to our own.

---

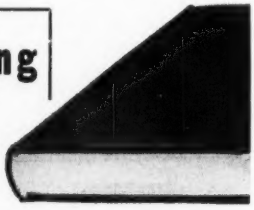
**BARREL FINISHING MANUAL.** A 16-page manual on barrel finishing processes has been announced by **Minnesota Mining and Manufacturing Co.**, 900 Fauquier Street, St. Paul, Minn.

Use of the "Honite" barrel finishing method, a low pressure, random honing process for deburring and burnishing small metal parts, is discussed in detail in the illustrated booklet.

Included are sections on how to choose proper size "Honite" and "Super Honite" barrel finishing chips for specific operations, and selection of the correct "Honite" barrel finishing compounds for each.

Ten "Honite" barrel finishing compounds are described, together with the purpose, characteristics, metals for which they are recommended, and the prescribed mixture for each.


**Bringing you Modern developments in plating processes and methods**



HERE are the basic theories and principles of electroplating—the practical methods and processes that are of invaluable use to everyone concerned with electroplating and electrotyping. The most efficient methods of making electrodeposits on more than 40 different metals, alloys, and plastics are summarized completely in this thoroughly revised and enlarged book.

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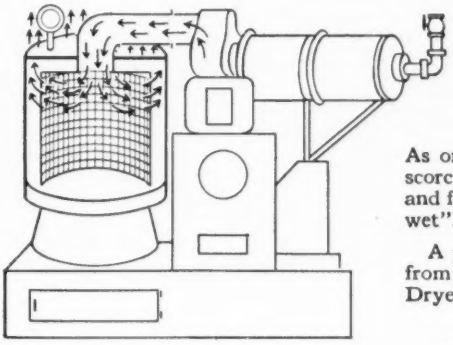

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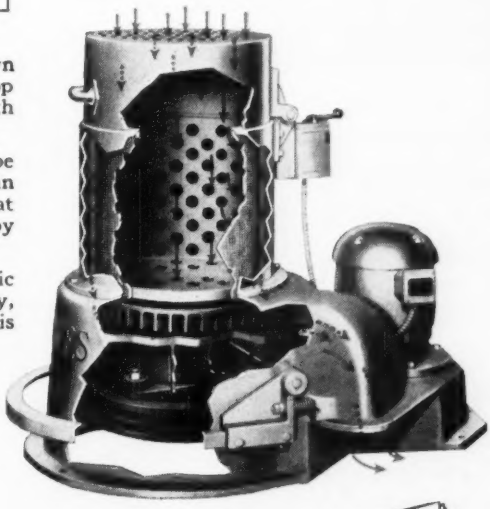

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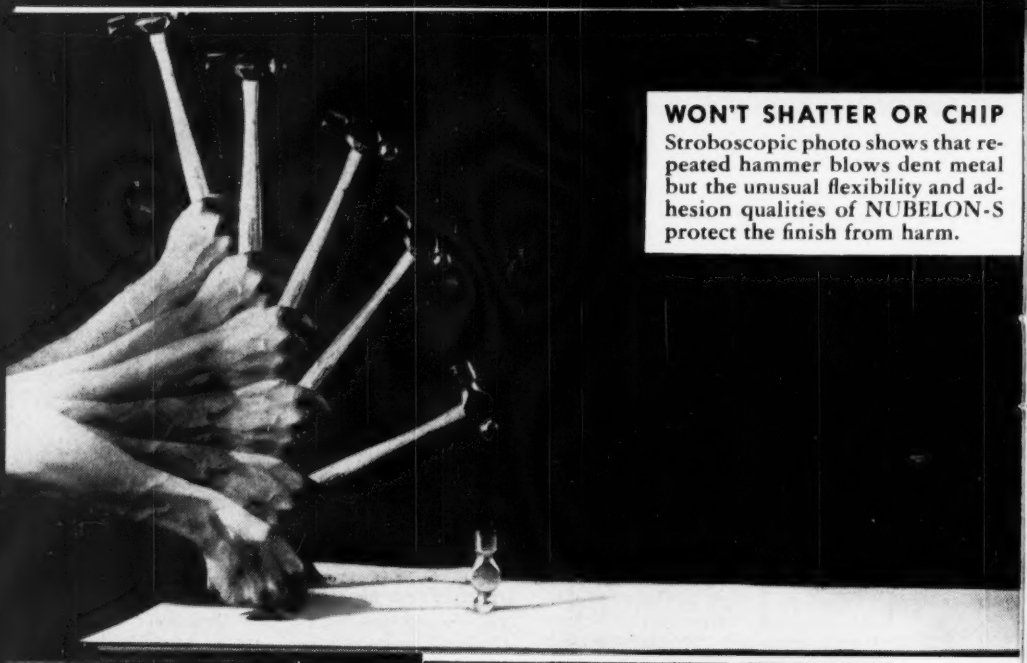

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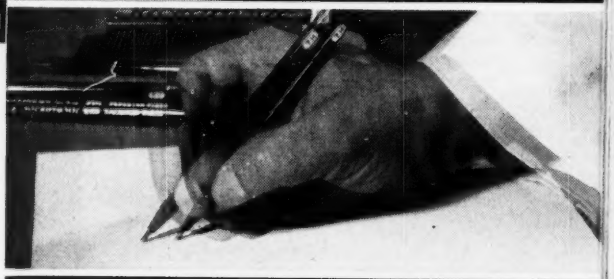

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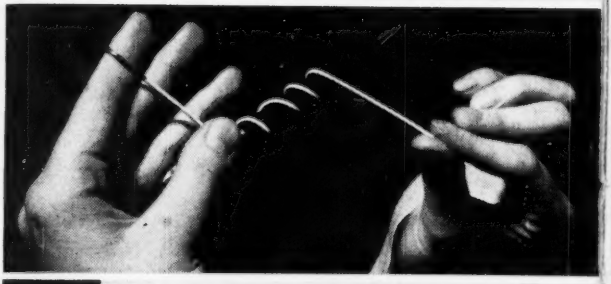

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# Spotlighting FINISHING Progress

THIS month's "Spotlighting Finishing Progress" feature was prepared by Dr. Seymour Senderoff, supervisory chemist, Electrodeposition Section, National Bureau of Standards. It is a great pleasure to announce that Dr. Senderoff will serve as one of the Contributing Editors of this feature of the magazine.

Seymour Senderoff received both B.S. and M.S. degrees from the City College of New York, majoring in chemistry, and the Ph.D. degree in physical chemistry from the University of Maryland.

He entered the plating industry in 1941 as a research chemist with United Chromium, Inc., and, for a time, was in charge of their pilot plant.

In 1947 he joined the staff of the Electrodeposition Section of the National Bureau of Standards. His studies at the Bureau include: stress in electrodeposits, the electrochemistry of aqueous solutions at elevated temperatures, electrodeposition of the refractory metals from non-aqueous systems, and coatings for use at high temperature.

In 1948 he received the Proctor Award from the American Electroplaters' Society for a paper of which he was co-author, describing the spiral contractometer, a new instrument for the measurement of stress in electrodeposits. He is the author of numerous papers on plating and related subjects.

Dr. Senderoff is a member of the Baltimore-Washington Branch of the American Electroplaters' Society and was formerly a member of the Detroit Branch. He is also a member of the Electrochemical Society and the American Chemical Society.

**Dr. Seymour Senderoff**
**Supervisory Chemist,**
**Electrodeposition Section**
**National Bureau of Standards**

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

In This Issue:

Electrodeposition of Alloys
Tin-Nickel Alloy Plates
A High-Conductivity Glass-to-Metal Seal
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## Electrodeposition of Alloys

THE electrodeposition of alloys has been one of the major interests among research workers in the field of electroplating for many years. Among the leading workers in this field is E. Raub, whose work is only slightly known in this country because he has published little, if anything, in the English language. Since his many papers in various German publications represents some of the most authoritative modern work on many alloy systems, it is of interest to summarize here a recent review on alloy deposition which Dr. Raub has published in METALLOBERFLACHE **7**, 17A (1953).

Dr. Raub points out that the interest in alloy plating arises from the fact that alloy deposits are usually fine-grained, bright, and frequently have superior corrosion resistance, hardness, and abrasion resistance. Further, alloys of metals such as copper and gold can be obtained in a wide range of colors. Many alloy deposits easily become passive, and so have high tarnish resistance. In addition, alloy deposition provides a means for conservation of rare or strategic metals, and finally it provides a method for making coatings with metals such as molybdenum or tungsten which cannot be deposited alone from water solution.

In spite of these attractive possibilities alloy plating has thus far had only limited commercial application. The reasons for this, according to Dr. Raub are threefold:

1. The properties of electrolytic alloys are occasionally very different from those of cast or recrystallized alloys.
2. The electrodeposition of alloys is frequently associated with rather critical electrochemical conditions which have not as yet been adequately studied and defined.
3. The preparation of alloys with reproducible properties is often difficult with the present state of knowledge of many systems. Merely keeping the composition

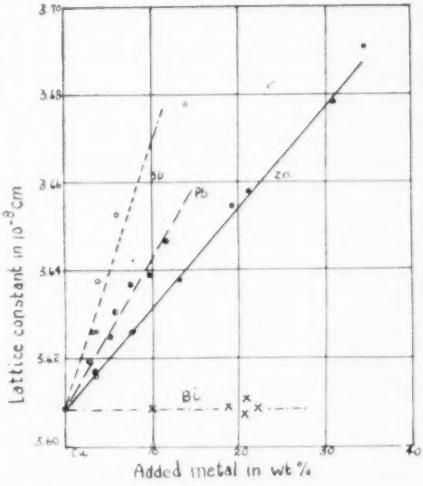


Fig. 1—Lattice constants of electrolytically deposited copper-rich copper alloys.

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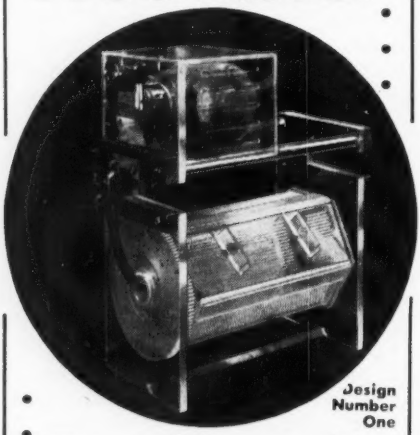

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of thick layers constant is sometimes difficult, and certain poorly understood variables are difficult to control in operation.

In an attempt to provide more fundamental knowledge of various alloy systems, The Research Institute for Noble Metals (Germany) has studied over twenty binary systems involving alloys of nickel, copper, silver, gold, and some other metals in a rather thorough fashion. Certain salient points which have come out of this work will be considered here.

Dr. Raub emphasizes that the codeposition of two metals depends on the relative positions of their deposition potentials, not their equilibrium potentials. Cathodic processes, like anodic processes, are, in general, not reversible, and the metals deposit with a definite polarization which varies from metal to metal and depends on the composition of the electrolyte and on operating conditions. The most significant fundamental information on alloy deposition systems are the current density-cathode potential curves for the individual metals in the electrolyte under consideration, and the corresponding curve for the alloy deposit. While the latter may be in the same general region as those of the individual metals, there is no simple relationship between the curve for the alloy and those for the individual metals. The basic requirement for codeposition of two metals is that over some range of current density their current density-cathode potential curves shall be close together. Complex ion formation, such as occurs in cyanide electrolytes, is one of the important methods of bringing the current density-cathode potential curves

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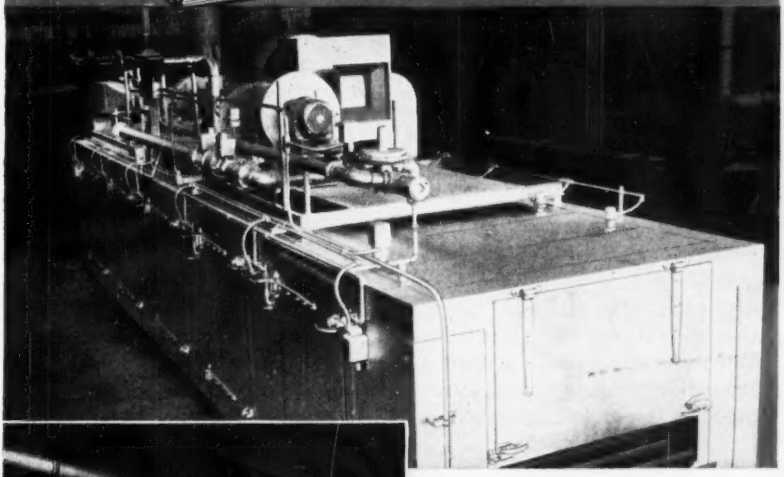

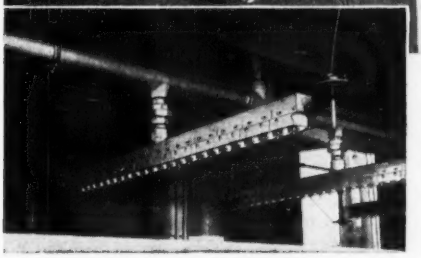

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of metals, normally far apart, close enough together to effect codeposition. The use of addition agents which have a large specific effect on the deposition potential of one of the metals and little or no effect on the other is another method of accomplishing this purpose. Copper and lead in a perchloric acid solution normally do not codeposit. Addition of thiourea displaces the current density-cathode potential curve of copper to values which are about 0.45 volt more negative, while it hardly affects the lead curve. As a result, lead and copper may be codeposited from perchloric acid solutions containing thiourea.

Finally, certain metals, like nickel, have a large intrinsic polarization so that even from simple salt solutions, their deposition potentials are widely displaced from their equilibrium potentials. As a result, nickel-zinc alloys may be plated from sulfate solutions.

Many examples of the application of current density-cathode potential curves are given, together with a wealth of data on various systems. One of the most interesting is a demonstration of how the anomalous behavior of brass solutions may be correlated with the curves observed for this system. At low current densities in cyanide brass solutions the copper content of the deposit decreases with increasing current density, indicating that here copper is the noble metal. At a specific current density near 0.5 amp./sq. dm., which varies with the composition of the electrolyte and with the degree of agitation, an inversion occurs and the copper content of the deposit then increases with increasing current density, indicating that the zinc has become the noble metal. The point of inversion corresponds to the beginning of hydrogen evolution observed as a break in the current density-potential curve for brass deposition. When hydrogen is evolved the cathode film becomes more alkaline, and it was shown by corresponding curves for the individual metals that an increase in alkalinity ennobles the zinc but hardly affects the copper.

Some of Dr. Raub's most interesting work has been on the structure of alloy deposits. He points out that, just as in the case of crystallization from melts, by electrolytic crystallization one may obtain (1) an intimate mixture of pure crystals of the individual components, (2) solid solutions consisting of substitutional or interstitial alloys, or (3) intermetallic compounds. However, the composition limits of the electrodeposited phases

*to page 62→*

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are not necessarily the same as those observed in the equilibrium diagram. In Fig. 1 is shown a plot of the lattice constants of electrodeposited copper alloys as a function of the content of added metal. Bismuth is seen to have no effect on the copper lattice. This is consistent with the equilibrium phase diagram which shows no appreciable solubility of bismuth in copper. The others show solid solution formation with resultant enlargement of the crystal lattice of copper. Zinc shows the same saturation limit as is observed in the equilibrium diagram. Lead, although practically insoluble in copper in the equilibrium state, forms a solid solution with copper containing as much as 10 per cent lead when lead and copper are codeposited electrolytically. Electrodeposited copper-antimony alloys also have a saturation limit higher than that observed in the equilibrium diagram for recrystallized alloys. Similar measurements were made on electrodeposited silver alloys. These showed more or less similar effects with the added complication that silver-cadmium alloys form either solid solutions or mixtures of the pure crystals of the individual metals, depending on the composition of the electrolyte. Gold-copper alloys, which form a continuous series of solid solutions on crystallization from melts, deposit mostly as crystals of the individual metals when electrodeposited. It is for this reason that electrodeposited gold-copper alloys may sometimes tarnish easily, even when the gold content is rather high. The free copper evidently causes the tarnishing. A heat treatment, however, will form the solid solution and in-


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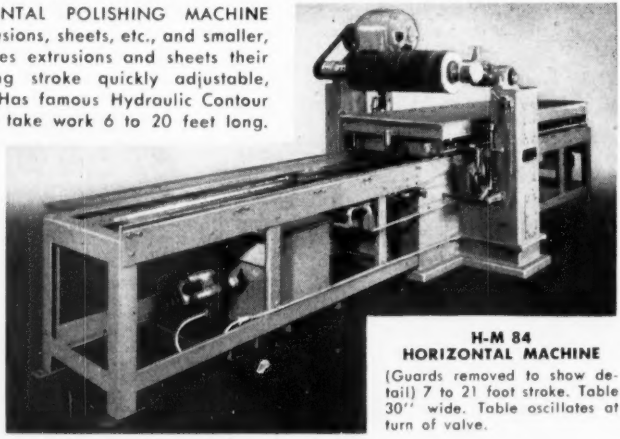

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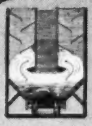

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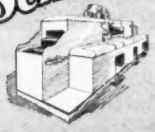

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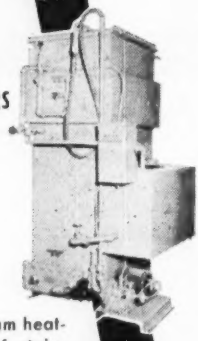

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crease the tarnish resistance.

This illustrates a very fundamental property of electrodeposited alloys. On proper heat treatment they can be converted to the normal equilibrium composition of a recrystallized alloy prepared from melts. However, the mechanism of the precipitation of supersaturated solid solutions prepared by electrodeposition and those prepared from melts is entirely different. The rate of precipitation is anomalous, usually very rapid and independent of the degree of supersaturation. The hardness changes are also anomalous. The changes in hardness are also anomalous when one anneals unsaturated electrodeposited solid solutions. The hardness always remains higher than that of annealed crystals prepared from melts, while the specific resistance and lattice constants undergo normal changes on annealing. The hardness of intermetallic compounds, however, is usually lower when electrodeposited than when produced from melts. Dr. Raub believes that, on the basis of X-ray diffraction and other evidence, most of these anomalies arise from the fact that electrodeposited solid solution alloys have severely distorted crystal lattices with only comparatively small domains of extensively coherent atom groups. The distortions arise, he believes, from codeposited non-metallic impurities. It is these that give electrodeposited alloys their characteristic properties.

The current density-cathode potential curves assist in predicting, in some cases, the structure of the deposit. If the curve indicates that at low current density one pure metal is deposited, and an alloy deposits only above a break in the curve, then

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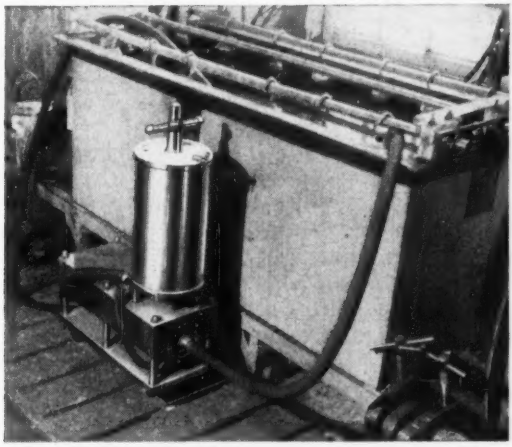

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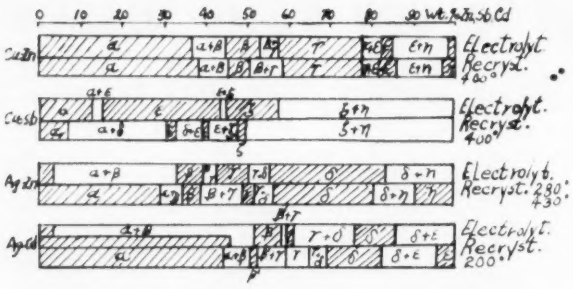

Fig. 2—The phase composition of various electrolytic and recrystallized alloys. Shaded areas are single phase fields.

the deposit usually consists of a mixture of pure crystals of the components. If the alloy deposits start at a very low current density without the appearance of a break in the curve, then extensive, if not continuous, solid solution formation occurs.

Figure 2 shows a comparison of the phase composition of some electrodeposited alloys with the equilibrium phase composition of alloys produced from melts. Note the absence of the $\delta$ phase in the copper-antimony alloys and the rather wide concentration displacements in most of the others. The electroplated c o p p e r - z i n c system, however, is very close to equilibrium conditions. In the diagram for the silver-cadmium alloys the range below 50 per cent cadmium is split into two parallel fields because one may obtain either single phase or two-phase systems, depending on the composition of the electrolyte.

The metallographic structure of electrodeposited alloys is characterized by laminations. Sometimes a coarsely laminated structure is observed superimposed on a finely laminated structure. These are frequently caused by periodic variations in the composition of the deposit, and are usually obliterated by long treatment at elevated temperatures. Also, typical forms of crystal growth for various phases may be observed. The spheroidal crystallites which have been observed in electrodeposited $\beta$-brass are also seen in many other alloy systems.

In view of the many possible technical applications of electrodeposited alloys, and the great complexity of their properties, Dr. Raub concludes that further study of the electrochemistry, growth, and structure of these alloy deposits is highly desirable.

* * *

## Tin-Nickel Alloy Plates

INFORMATION on the operating characteristics and properties of the deposits obtained from a new tin-nickel alloy plating process are presented in a paper by J. W. Cuthbertson, N. Parkinson, and H. P. Rooksby in J. ELECTROCHEM. SOC. **100,** 107 (1953).

The recommended electrolyte contains 50 g/l of stannous chloride, 300 g/l of nickel chloride, 28 g/l of sodium fluoride, and 35 g/l of ammonium bifluoride. It is operated at 65 deg C. (150 deg. F.) and a current density of 18 to 36 amp./sq. ft. with tin and nickel anodes controlled by separate circuits. The deposits are said to be bright, as tarnish resistant as chromium, and very uniform over a wide range of current density and solution composition (see Fig. 3).

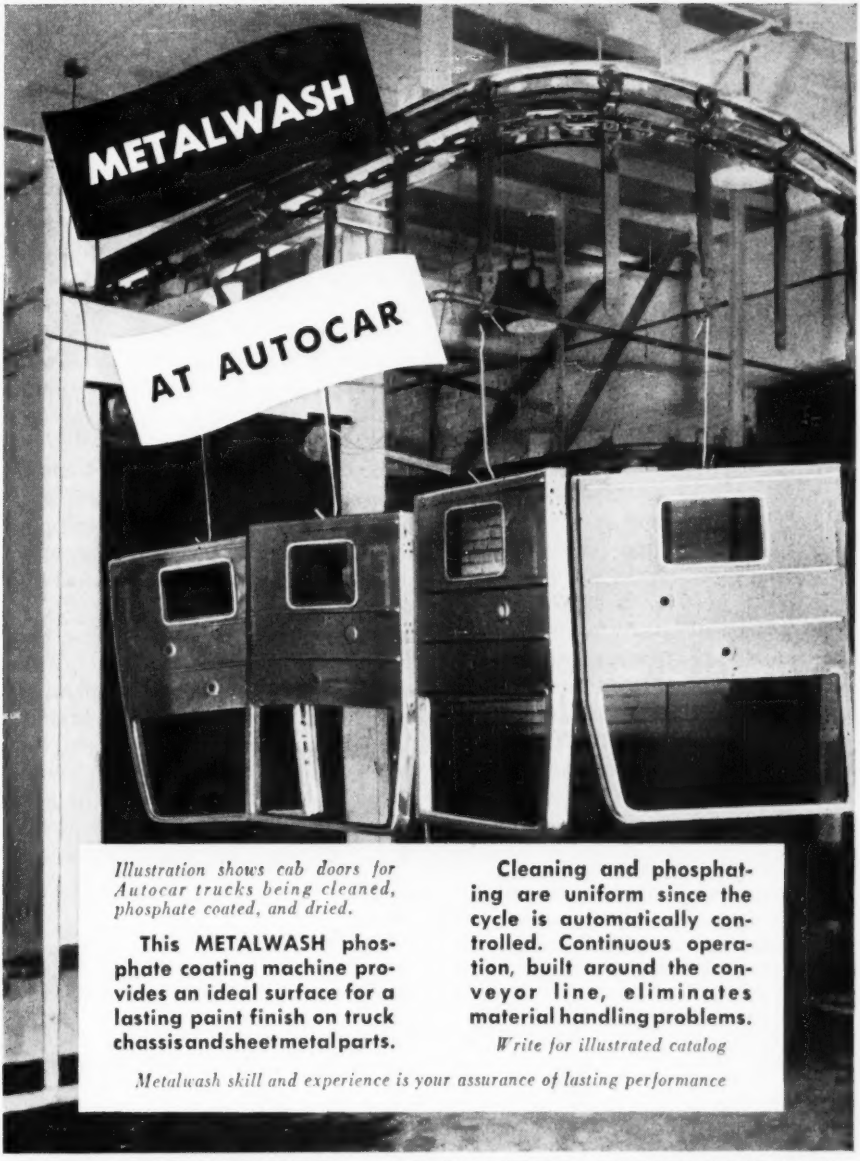


*Illustration shows cab doors for Autocar trucks being cleaned, phosphate coated, and dried.*

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Fig. 3—Some products finished in tin - nickel alloy plate. (Photo courtesy Tin Research Institute, Inc.)

The authors critically examined the functions of the constituents of the bath and the effects of their variation by means of current density-cathode potential curves and bent cathode tests on the solution, and stress measurements and X-ray studies on the deposits. The potential studies showed that the fluoride ion forms complex ions with both the tin and the nickel, but more strongly with the former than with the latter. While tin and nickel may be codeposited from simple salt solutions with difficulty, such solutions are not practical, mainly because of the wide variation of deposit composition with small variations of the tin: nickel ratio in the solution. In the presence of fluoride, a deposit containing approximately 65 per cent tin and 35 per cent nickel is obtained over a wide range of solution composition and current density as shown in Table I. A fluoride concentration of about 2.0 M is found to be optimum, and the authors indicate that a complex ion such as $(SnCl_2F_2)^{2-}$ may be formed as well as a complex containing both the tin and the nickel. They believe that a mixed metal complex ion may actually be the one that is reduced at the cathode to form the alloy deposit.

Temperature variation has a profound effect on the composition of the deposits. If the operating temperature is reduced from the optimum of 65 to 45 deg. C., the current density must also be reduced to relatively low values. Below 45 deg. C. almost pure tin is obtained at very low current densities. This behavior is explained by the cath-

**Table I**

EFFECT OF TIN-NICKEL RATIO IN ELECTROLYTE ON DEPOSIT COMPOSITION

| | Per Cent Tin in Deposit at a Current Density of: | | | |
|---|---|---|---|---|
| $NiCl_2$ (g/l) | 5 asf | 15 asf | 24 asf | 40 asf |
| 20 | 92.3 | 88.8 | — | — |
| 60 | 70.5 | 76.5 | 79.0 | — |
| 100 | 69.5 | 72.5 | 82.3 | — |
| 150 | 66.8 | 69.8 | 72.3 | — |
| 200 | 65.5 | 66.5 | 68.5 | — |
| 300 | 63.3 | 64.8 | 65.8 | 63.3 |
| 400 | 62.8 | 64.8 | 62.3 | 63.0 |

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# Technical Service Data Sheet

## Subject: HOW *GRANODIZING* PROTECTS STEEL DRUM SURFACES FROM RUST AND IMPROVES PAINT ADHESION

### NEW DEVELOPMENT IN CONTAINER INDUSTRY

United States Steel Products Division, United States Steel Company is now producing grease-free, scale-free, rust-inhibited steel drums. The Granodizing process embodies the following steps:

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ORDINARY PAINTED DRUM after a year of exposure to weather is badly rusted. Rust was very apparent after only one week.

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They are rust-inhibited with a zinc phosphate coating. "Granodine" zinc phosphate coatings have been standard practice for many years in the automotive and appliance industries for long-lasting paint protection and metal preservation.

ode potential studies. It seems that between 50 and 70 deg. C. the cathode potential-current density curves for the alloy deposit are displaced only slightly, but below 50 deg. C. the displacement to more negative values is more rapid. Further, studies on solutions containing the individual metals show that the deposition potential of nickel is far more strongly affected by changes in temperature than that of tin. It was also found that certain wetting agents cause serious displacement of the deposition potentials and their presence results in the deposition of pure dull tin instead of the bright alloy. Variations in fluoride content and free hydrofluoric acid have only small effects on the deposit composition.

The authors point out that although the deposits are rather hard (about 700 Vickers) and somewhat brittle, they are still serviceable if they are deposited without internal stress. They find from stress measurements that potassium and sodium ions in the electrolyte induce compressive stress in the deposit and that ammonium ions in the electrolyte produce a tensile stress. The recommended composition containing both sodium and ammonium ions gives a plate with no stress, since the effects of the two ions balance each other.

Throwing power studies have shown that the brightness, composition, and thickness over irregularly shaped cathodes is exceptionally uniform. A quantitative evaluation shows that the throwing power of the tin-nickel electrolyte is of the order of that of a copper sulfate solution. It is poorer than that of a silver cyanide solution but better than nickel plating solutions.

*to page 74→*


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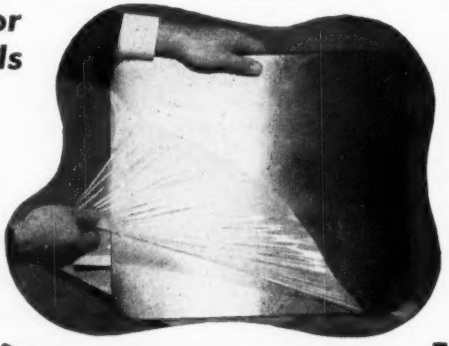

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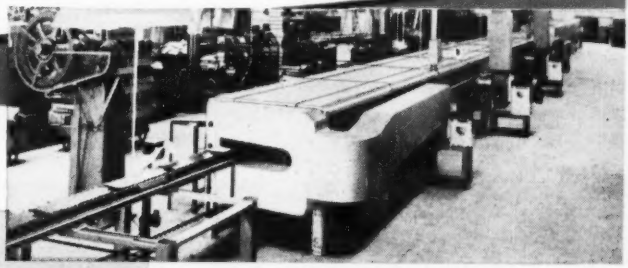

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On investigating the structure of the deposits, it was found that only single phase deposits which approximate the composition NiSn (67 per cent tin, 33 per cent nickel) are bright. This phase is metastable and does not appear in the equilibrium diagram. When a single phase bright deposit of this composition is heated above 300 deg. C., a two-phase structure containing $Ni_3Sn_2$ and $Ni_3Sn_4$ results. These are the equilibrium phases for this composition. Actually, a single phase alloy corresponding to the composition of NiSn cannot be made by any means other than electrodeposition. An attempt to cast anodes of this composition results in the two-phase structure. Since the $Ni_3Sn_2$ phase dissolves preferentially in the electrolyte, such anodes are undesirable. It is for this reason that the separately controlled nickel and tin anodes are recommended for use with this solution.

It is found that the metastable NiSn phase has the hexagonal structure of $\tau'$ $Ni_3Sn_2$ but the axial ratio of 1.25 is smaller than the minimum value of 1.26 established for $Ni_3Sn_2$ richest in tin. The range of composition for persistence of the characteristic hexagonal phase extends from about 57 to nearly 75 per cent tin and so the limitation of bright plates to a single phase structure does not represent a particularly critical requirement with respect to composition. In deposits which had both bright and dull areas it was shown by X-ray diffraction studies that the dull areas had concentrations of the $Ni_3Sn_4$ phase.

In addition to being single phase, it was found that bright deposits had considerable preferred orientation. A single phase deposit produced under

*to page 76→*


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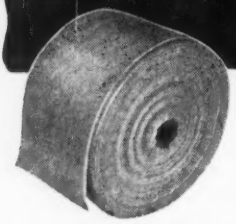

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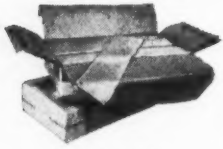

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special conditions without preferred orientation was dull. Finally, the crystals in bright deposits are rather small, approximately 0.05 micron in diameter.

The authors point out that the metastable structure of the bright deposits can be obtained only if the ions are discharged with sufficient surplus activation energy to form the higher energy NiSn phase rather than the equilibrium phases of lower potential energy. This surplus energy of activation is supplied by the high operating temperature of 65 deg. C. Below 45 deg. C. the discharged ions do not have sufficient energy and this alloy therefore cannot be deposited from this type of solution at lower temperatures.

In discussing the state of the ions in the electrolyte the authors state that the following facts have been established:

1. The chloride-fluoride electrolyte favors the codeposition of tin and nickel in equal atomic proportions.

2. An entirely different electrolyte containing the two metals as acetates when operated at temperatures above 65 deg. C. has been found to produce bright tin-nickel alloy plate of the same composition as that obtained from the chloride -fluoride electroyte.

3. Both of these electrolytes deposit a tin-nickel alloy chemically by direct immersion on tin.

It is difficult to explain the constancy of composition of the cathode deposit which, from the practical viewpoint, is one of the most noteworthy features of the chloride-fluoride bath, by any mechanism other than one involving the presence in the solution of a complex ion containing both nickel and tin. Further evidence for this is the observation that after the nickel chloride has been dissolved and one half the requisite amount of fluoride added, a precipitate forms in the bath. This redissolves on addition of stannous chloride, and no further precipitation occurs when the rest of the fluoride is added. Finally, a crystalline compound with the formula, $NiF_2.2SnF_2$ has been isolated from the bath. Since these cannot be considered as constituting unambiguous proof of the existence of a tin-nickel complex ion in the electrolyte, further work is in progress on this subject. It is known that simple ions are also present in the electrolyte, but they apparently take no part in the electrode reaction under normal operating conditions, because of their high deposition potentials.

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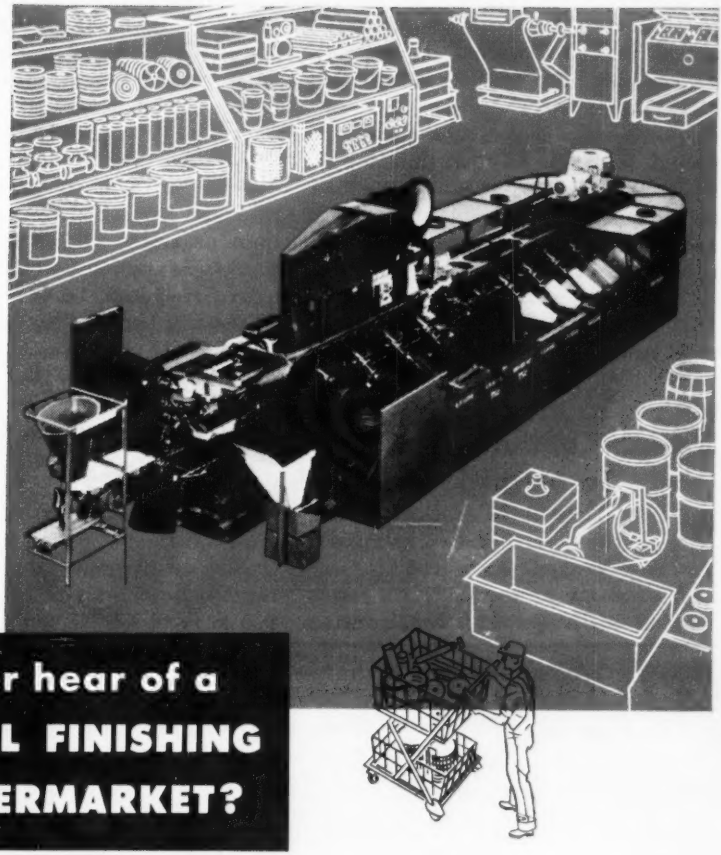

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commercial operation in England has shown that the process is basically satisfactory. The authors state that "the brightness of the deposit, however, has not normally been quite good enough to enable all final finishing to be dispensed with, while pitting has occasionally been troublesome." The correction of these defects is now under study and the authors say that in view of the short period of industrial use, they regard the results as most gratifying.

* * *

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A very interesting application of electroplating for the solution of a troublesome engineering problem has recently been described by J. C. Turnbull in RCA REVIEW **13**, 291 (1952).


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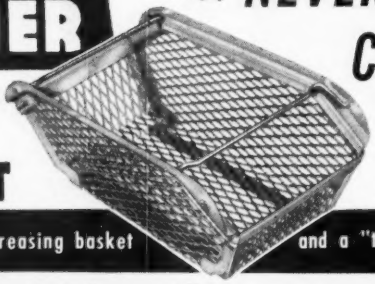

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In power tubes for electronic equipment the use of Kovar - to - glass seals is widespread. These seals are very resistant to mechanical and thermal shock and are easy to fabricate, but at high frequencies they tend to heat up rather rapidly, due to the comparatively low electrical conductivity

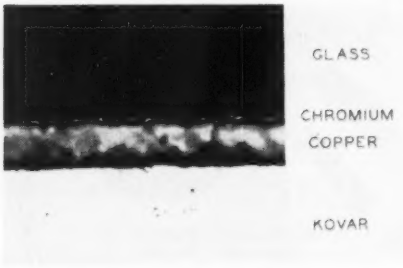


Fig. 4—Cross-section (400X) of a glass-to-metal seal using Kovar plated with copper and chromium. (Photo courtesy Radio Corporation of America)

of Kovar. Dr. Turnbull has found that copper, whose conductivity is much higher than that of Kovar, can be plated over the Kovar and thus reduce the heating at high frequency. However, copper is not particularly suitable for making a satisfactory glass-to-metal seal, and so Dr. Turnbull plates a thin layer of chromium over the copper and oxidizes it under controlled conditions. The chromium oxide layer thus formed makes an excellent seal to glass. Glass-to-metal seals with diameters up to 6½ inches have been made with this composite copper - chromium coating and have been used in several frequency modulation and television transmitting tubes.

Dr. Turnbull recommends the following procedure for producing these high-conductivity seals:

1. The Kovar parts are cleaned thoroughly and copper plated.
2. The parts are then fired in hydrogen and checked for blisters.
3. The copper plated parts are plated with chromium and fired in a dry hydrogen atmosphere (dew point -50 deg. C).
4. The finished parts are oxidized by firing in moist hydrogen.

Glass may be sealed onto this finished part by standard factory procedures. In fact, the conditions for forming the glass seal are less critical than those for unplated Kovar.

Figure 4 is a photomicrograph of a cross-section of a seal of this type. The black area at the top is glass, the light area at the bottom, Kovar. The thin light layer under the glass is chromium (0.00005 inch thick) and under that is the copper plate (0.0013 inch thick). The copper layer under the chromium was oxidized to emphasize the chromium.

The thickness of the copper plating is limited only by its effect on the residual strain in the glass, and the chromium plating should be thick enough not to oxidize through to the copper. The quality of the seal which is obtained depends to a large extent on the nature of the chromium surface which is oxidized in the final step of the preparation. If the oxide is defective due to inadequate time, temperature, or atmosphere in the dry hydrogen firing step, leaks, bubbles, or poor adherence of the glass may result. Figure 5A shows a typical microscopic crack pattern in the chromium plated surface before firing. Figure 5C shows this surface after firing in air or wet hydrogen. The oxide at the cracks is heavy, and may show poor adherence and permeability to air. Such a surface is undesirable for seals. Dry hydrogen firing at a temperature close

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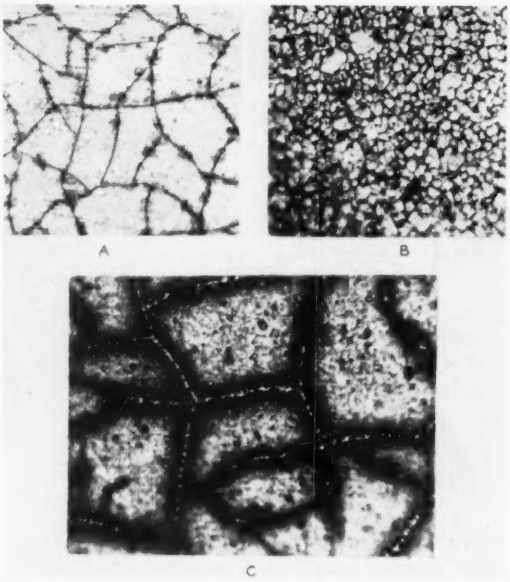


Fig. 5—Surface of a chromium-plated strip; (A) after etching in HCl, (B) after firing in dry hydrogen, (C) after firing in air.
*(Photo courtesy Radio Corporation of America)*

to the melting point of copper produces the surface shown in Fig. 5B. Dr. Turnbull points out that this surface is free from cracks and greatly reduced in porosity.

In analyzing the nature of residual strains in the seals, the author points out that since copper has a higher coefficient of thermal expansion than Kovar, the copper plating is subjected to strain as a result of temperature changes. It was found that 12 per cent of copper cladding on either side of a Kovar sheet increased the thermal expansion coefficient of the Kovar sheet by 6 per cent when measured in a direction parallel to the plate. The glass strains can therefore probably be kept low, especially since the stress to deform the copper comes principally from the Kovar rather than from the glass. However, the transverse thermal coefficient is rather strongly increased by the copper plate. A plated Kovar sheet of which only 1 per cent is copper shows a 6.6 per cent increase in the thermal expansion in the design of high-conductivity seals.

Various types of seals are discussed. "Outside" cylindrical seals, two inches in diameter, with up to 0.0015 inch copper on 0.030 inch Kovar were highly resistant to thermal shock and could be subjected to a boiling water -liquid air temperature cycle without breakage. A copper plate of 0.0035 inch thickness, however, caused breakage even under slight thermal shock. "In-and-out" butt seals with 0.0003 to 0.003 inch copper plate all showed high strains. In a flange seal, the high transverse thermal expansion of copper plated Kovar produces no strain in the glass. Seals of this type were made from 0.020 inch Kovar plated on either side with 0.0035 inch copper and were found to be highly resistant to thermal shock. This type of seal is most satisfactory for heavily plated material.

Flange seals were made with 0.001 inch chromium on 0.030 inch Kovar and residual strains were found to be three or four times that found with the same amount of copper plate. Severe temperature variation cycles, however, had no permanent effect on the residual strain for the seal because of the ab-

*to page 86→*

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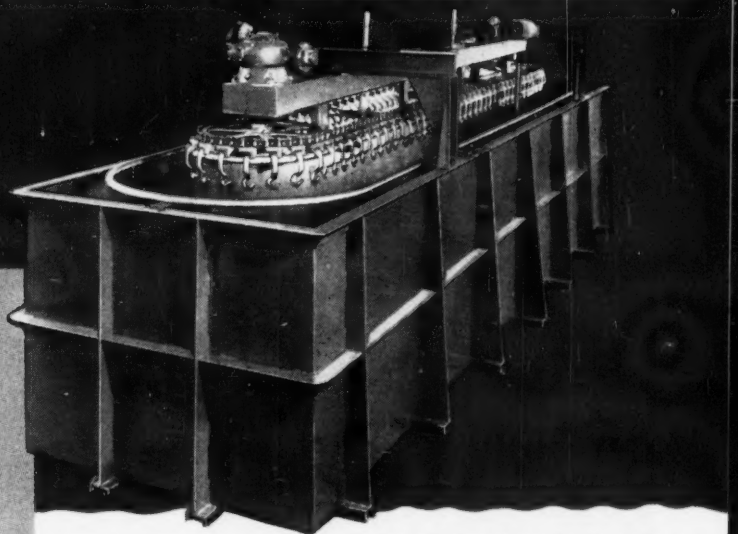

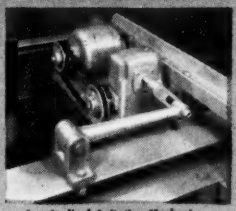

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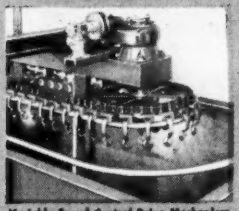
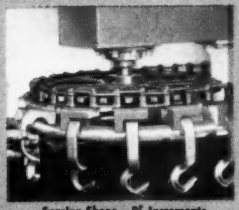


Variable Speed Control-Drive Mechanism



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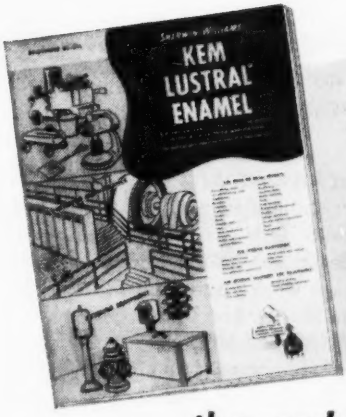


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sence of plastic flow in chromium and its low thermal expansion. The author believes chromium alone might make a good high conductivity seal with alloys used in seals to soft glasses.

Dr. Turnbull made controlled measurements on the heating of test seals at a frequency of 120 megacycles.

It was found that the conductivity of the seals is independent of the thickness of chromium between 0 and 0.00015 inch within experimental error. The plated Kovar seals have a current carrying capacity more than five times that of unplated Kovar at 120 megacycles, and a conductivity more than 25 times that of Kovar.

* * *

## Aluminum Plating

THE electroposition of aluminum has undergone a considerable revival of interest. After the early work of Blue and Mathers[1] in 1934 and 1936, little was done on this subject until very recently, when a group of new processes were disclosed in quick succession. Hurley and Wier[2] announced a process using aluminum chloride, ethyl pyridinium chloride, and toluene in 1948; Couch and Brenner[3] described the plating of aluminum from a solution of aluminum chloride and lithium aluminum hydride in ether in 1952; and finally, the most recent paper on

---

[1] R. D. Blue and F. C. Mathers, Trans. Electrochem. Soc. 65, 339 (1934); 69, 519, 529 (1936).

[2] F. H. Hurley and T. P. Wier, U. S. Patent 2,446,349, Aug. 3, 1948.

[3] D. E. Couch and A. Brenner, J. Electrochem. Soc. 99, 234 (1952).

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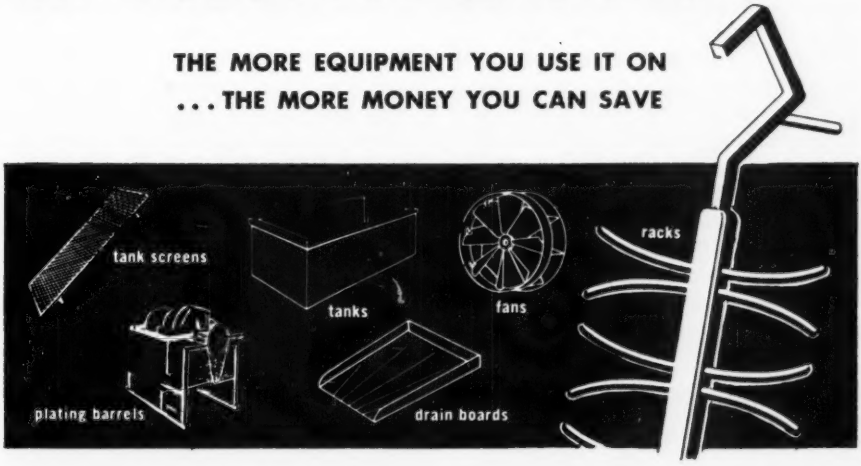


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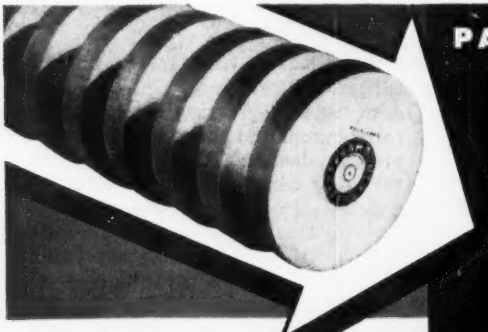
this subject, which describes still another process, was published by W. Menzel in ZEIT. fur ANORGANISCHE u. ALLGEMEINE CHEMIE **269**, 52 (1952).

Dr. Menzel describes four methods of preparing aluminum plating baths which represent an extension of the early work of Blue and Mathers. He also shows, by isolation of the active material and its analysis, that the compound from which aluminum is plated is of the same type in all of his baths, as well as in that of Blue and Mathers. The isolated compound is identified as $(Ar.AlCl_2)_2.ArH$, where Ar is some aryl group, that is phenyl, toluyl, xylyl, and so on.

Further, the author points out, this type of compound is probably involved as an intermediate in the well-known Friedel-Craft reaction which is widely used in organic synthesis, and so its study would have general interest in organic chemistry in addition to its value as a means for the plating of aluminum.

The first type of aluminum plating bath described by Dr. Menzel is prepared by dissolving aluminum triethyl etherate in xylol, adding aluminum chloride, and warming until layer separation occurs to yield a red-brown oil covered by a xylol-rich lighter colored layer. The lower oily layer is the electrolyte from which aluminum is plated and the upper layer protects the electrolyte from contamination by the atmosphere. Further protection is accomplished by plating in a covered cell. The author claims that at 15 to 20 deg. C., with 4 volts across the cell, a current density of 0.870 amp./sq. dm., and a plating time of one hour,

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a bright adherent aluminum coating was obtained on a copper cathode. The cathode current efficiency was about 65 per cent and the anode current efficiency was about 90 per cent. It was found that the deposits become brighter with decreasing current density and darker when the current density is increased.

The author claims that baths prepared in this manner are more stable than those previously described in the literature. In addition, he points out that when the electrolyte has been poisoned by moisture from the air, it can be brought back into satisfactory operation by distillation under reduced pressure in an inert atmosphere. A necessary requirement for good aluminum deposition is that contamination of the bath by moisture be prevented as far as possible. When appreciable contamination has occurred, the bath is distilled and aluminum chloride added to the distillate to raise its aluminum content to its normal value. Plating from the resultant bath will be identical to that of a freshly prepared one both in type of deposits obtained, and conditions of electrolysis.

To identify the active ingredient in the plating bath, the bath was distilled at 18 mm pressure under nitrogen and the fraction boiling at 149 to 150 deg. C. was collected and analyzed.

It was found to contain 28.4 per cent xylol, 15.07 per cent aluminum, and 40.22 per cent chlorine. It also contained 39.60 per cent carbon after removal of the xylol, and this carbon was taken to represent the ethyl radical in the compound. The analysis corresponds closely to the formula, $(C_2H_5AlCl_2)_2.C_8H_{10}$.

Another plating bath was prepared by dissolving aluminum triphenyl in xylol and adding aluminum chloride. The aluminum triphenyl was prepared by first forming phenyl magnesium bromide by the reaction of magnesium with phenyl bromide in ether solution. Aluminum chloride was then added to the reaction mixture which was warmed and finally filtered. The filtrate was evaporated to dryness and the residue extracted with xylol in which the aluminum triphenyl dissolved.

Plating studies, conductivity measurements, and potential-current determinations, were done on this bath. Table II shows the plating results which were obtained by using an aluminum anode and copper cathode in this bath at room temperature. In all cases the aluminum deposited in an adherent, finely crystalline state. The deposits are better and the current efficiencies higher at the lower current densities.

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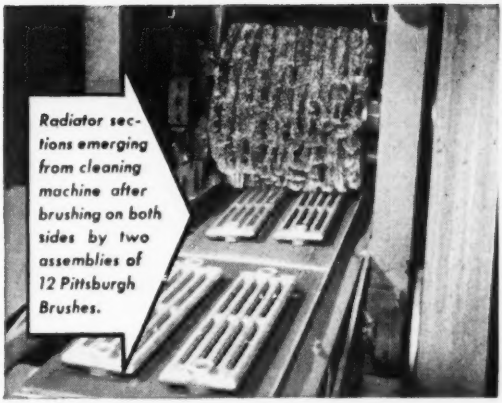
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**Table II**

RESULTS OF ELECTROLYTIC EXPERIMENTS

| Volts | Current (ma.) | Current Density (amp/dm²) | Plating Time (min.) | Cathode Area (cm²) | Cathode Eff. % | Al Deposited (mg.) | Deposit Thickness (micron) |
|---|---|---|---|---|---|---|---|
| 8 | 8.5 | 0.177 | 70 | 4.8 | 86 | 2.9 | 2.4 |
| 8 | 11.0 | .275 | 55 | 4 | 62 | 2.1 | 1.95 |
| 8 | 10.4 | .149 | 60 | 7 | 83 | 2.9 | 3.8 |
| 10 | 13.25 | .175 | 130 | 7.6 | 81 | 7.8 | 3.8 |
| 10 | 16.5 | .330 | 75 | 5 | 70 | 4.8 | 3.55 |
| 8 | 19.5 | .296 | 80 | 6.6 | 68 | 5.9 | 3.3 |
| 6 | 12.5 | .163 | 185 | 7.77 | 64 | 8.2 | 3.9 |
| 4 | 8.5 | .177 | 50 | 4.8 | 64 | 1.5 | 1.16 |

The anode efficiency is above 100 per cent in a fresh bath, but on continued electrolysis this value falls slightly. This bath is less sensitive to moisture than is that prepared with aluminum triethyl, and is therefore easier to operate. The conductivity was shown to depend on the aluminum chloride which was added to the bath.

The decomposition potential, using an aluminum anode and copper cathode, was found to be 0.08 volt and the current-voltage curve was linear and without breaks over the full practical plating range.

The third method for preparing an aluminum plating bath is one in which a xylyl-aluminum compound is the active ingredient. It is prepared in a simple manner. Aluminum chloride and xylol are heated to boiling and a complex compound forms with the evolution of hydrogen chloride gas. The reaction product which is decanted has excellent conductivity but does not plate aluminum. Instead, gas is evolved at the cathode on electrolysis. On warming this liquid with aluminum powder, however, a satisfactory plating bath is obtained. The analysis of the active ingredient of this bath gave results which corresponded closely to the formula $(C_8H_9AlCl_2)_2.C_8H_{10}$, similar to the type of compound formed when using aluminum triethyl to make up the plating solution.

The fourth method for making a satisfactory aluminum plating bath which is described by Dr. Menzel is probably the simplest of all. Aluminum powder is suspended in boiling xylol and dry hydrogen chloride gas is passed in. After the aluminum powder is consumed and two layers appear, the mixture is warmed with an additional small amount of aluminum powder.

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The resultant liquid, which contains the same active ingredient described above, makes an excellent plating bath.

Dr. Menzel believes that these complex metal-organo-halides are the most promising substances for the electrodeposition of aluminum because of their relatively high conductivity in organic solvents and the low solvation of the ions which they form.

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**RHEOSTAT BULLETIN TRA-527.** **Hanson-Van Winkle-Munning Co.,** Matawan, N. J., have described and illustrated the new H-VW-M tank rheostats in Bulletin TRA-527.

The bulletin lists standard ratings and sizes of the rheostats, used to adjust current density in plating tanks. It describes the rheostat mountings, the switching system and the short-circuit switch required for striking chromium or nickel on die castings. The design features stated to practically eliminate all switch failures by excessive heating are also described.

Photographs and drawings show front, rear and the side views of the rheostat. A schematic drawing shows a typical rheostat-to-tank hookup.

Also given are suggestions for selecting and ordering a tank rheostat to protect it from overloads due to changes in work area, solution temperature or line voltage.

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**USES FOR NICKEL PLATED METAL.** A four-page reprint of an article entitled, **"HIGH CORROSION RESISTANCE GIVES NICKEL PLATED METALS WIDE RANGE OF USES,"** is available from the **International Nickel Co., Inc.,** 67 Wall St., New York 5, N. Y.

Stressing the economy of using nickel plating rather than a solid alloy or clad metal for equipment subject to product contamination, the article describes how nickel plated equipment may be used in the chemical, food, petroleum and other processing industries. A number of diversified products plated with a nickel deposit 0.008 to 0.085 inches thick are described and illustrated in the article.


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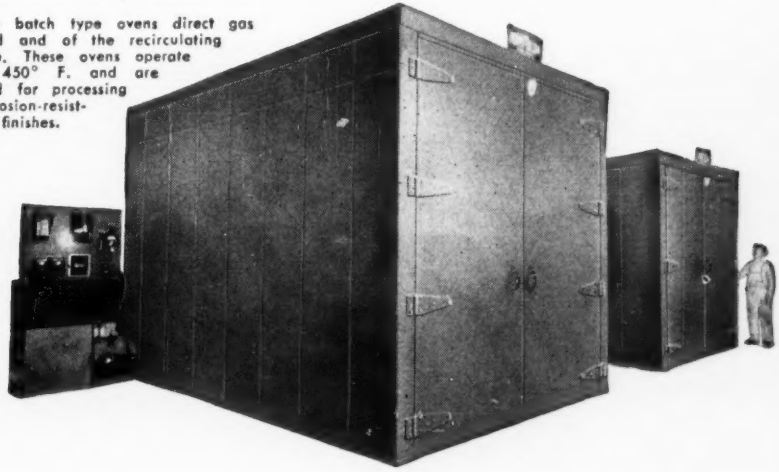

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# Practical Applications of modern products

## Parallel Conveyors Double Spray Booth Output

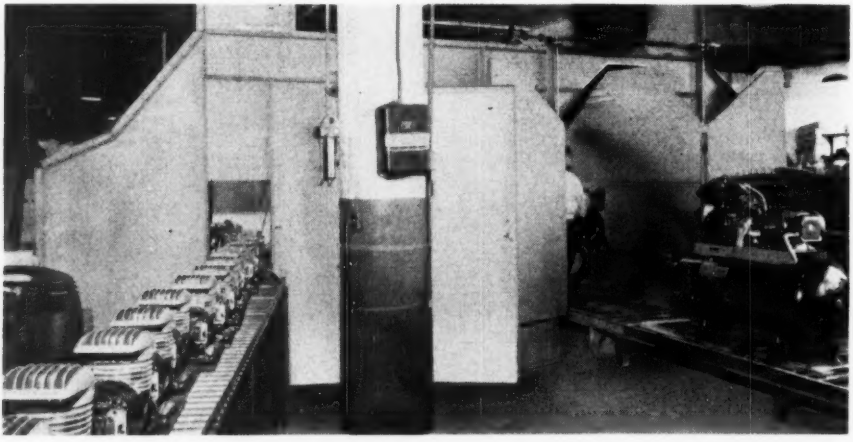
DeVILBISS Company manufacturing officials have put their own product to work on double duty. One spray booth now handles work formerly assigned to two booths.

The company, manufacturer of complete spray finishing equipment, has revamped its air compressor assembly lines so both the small portable models and the large compressors receive the finish lacquer coat in the same spray booth.

Formerly the two lines were located in separate parts of the manufacturing division. Now the lines parallel each other. The booth, a downdraft model, is designed to encompass both lines and a single spray operator handles touchup work and application of the finish coat. DeVilbiss engineers say that redesigning the assembly lines and building the new spray booth has resulted in a sharp reduction in down time.

The booth, in operation, is engineered to pull spray fumes and overspray downward from the operator toward the floor and thence up exhaust vents installed on the outer wall of the booth to blow clear of the building.

**This DeVilbiss Company spray booth, installed at the end of the company's own assembly line for air compressors, is designed to handle work formerly assigned to two booths and two spray operators.**



## Ceramic Coating Improves Drier Combustion Chamber

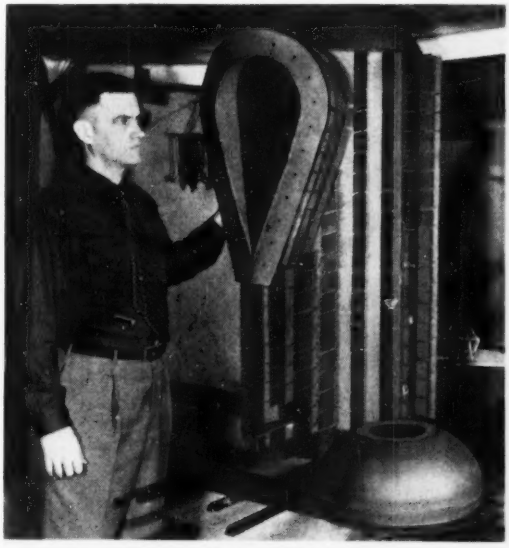
USING high temperature ceramic coatings originally developed for jet engine parts, the Hartzell Propellor Fan Company, Piqua, Ohio, has found that better combustion efficiency and heat transfer is possible for this combustion chamber which is part of its crop drier.

The coating is applied by Barrows Porcelain Enamel Company, Cincinnati.

The main part of the chamber is 18 inches in diameter and 60 inches long. A large number of protruding fins extend from the outer shell increasing overall efficiency. A secondary shroud heat exchanger completely surrounds the forepart of the drier. Due to this shroud collector ring, over 60 square feet of radiation area is added to the drier unit. This special feature reduces the overall length of the dryer by approximately one-half.

With the ceramic coating, the drier may be run for extended periods at temperatures ranging from 1000 to 1400 deg. F. Mild steel is used as the base metal thereby saving more expensive and scarce high alloy stainless steels. The coating also protects this base metal from scaling and physical breakdown which would result in the unit's failure.

Fins, shroud, and chamber are all coated in successive firing operations. Thicknesses range from 0.002 to 0.003 inch on all surfaces. Numerous welds are also coated.

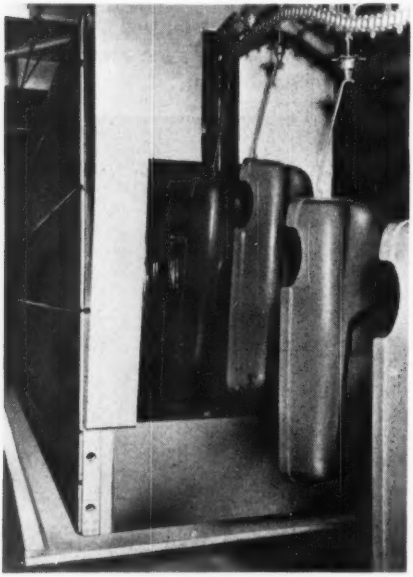


Combustion chamber of crop drier coated with porcelain enamel.

## Wheel Toy Manufacturer Improves Finish, Reduces Time With Infra-red Conveyorized Oven

THE BMC Manufacturing Co., Binghamton, New York, is recognized as one of the nation's quality leaders in the manufacture of wheel toys. To maintain such leadership, BMC must stress quality at every phase of its manufacturing operations. On products like wheel toys, a high quality, durable finish is, of course, all-important.

Approximately one year ago BMC planned and installed a new finishing system, which was designed to produce a hard, lustrous finish on wheel toys. For the finish baking operation proper, a Jensen Pan-L-Heat infra-red oven was installed. Painted parts are transported to and through the three-pass type oven by a conveyor, also built by Jensen, who is approximately 330 feet long, and travels at an average speed of 9 ft./min.



A view of the 42-foot Jensen Pan-L-Heat oven at BMC Manufacturing Co., Binghamton, N. Y. Total connected load is 203 kw. Operating temperature: about 300 deg. F.

Through the use of the conveyorized finishing system and the infra-red oven, the desired finish was produced. BMC operating officials then discovered that the new system would produce the same volume of work in 10 hours that the previous system had required 16 hours to accomplish. They also report that there has been no shut down for maintenance or repair during the year that the oven has been in operation.

A feature of the Jensen oven of particular interest to BMC officials is its ability to bake the finish, regardless of the color of the paint, without temperature adjustment.

All of these factors have contributed to the overall success that BMC is now enjoying with its new finishing system. At the same time the company has taken another step to keep the BMC name synonymous with fine quality in wheel toys.

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**DATA FOLDER ON PRECIOUS METAL PLATING SOLUTIONS.** A folder describing the composition and operation of precious metal plating solutions is available from **Auromet Corp.**, 267 Elizabeth St., New York 12, N. Y. The folder discusses the materials which Auromet furnishes for gold plating, platinum plating, palladium plating, and rhodium plating. Solution compositions, operating conditions, and other data of interest to the precious metal plater are included.

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You can depend on Harshaw products to keep your production moving. For more than fifty years we have concentrated on improving the quality of the anodes and chemicals used by platers.

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. . . still and barrel . . . nickel anodes—all commercial grades and sizes . . . anode bags . . . single nickel salts—nickel chloride . . . nickel carbonate . . . nickel fluoborate . . . boric acid.

## CHROMIUM PLATING

. . . pure "Krome Flake" 99.8% $CrO_3$ . . . sulphates less than .10% . . . lead, tin-lead and antimony-lead anodes.

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. . . copper ball anodes . . . Rochelle Salts . . . sodium and copper cyanides . . . copper sulfate . . . copper fluoborate.

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. . . ball and cast cadmium anodes . . . cadmium oxide . . . sodium cyanide . . . cadmium fluoborate.

## TIN PLATING

. . . cast tin anodes . . . sodium stannate . . . stannous sulfate . . . tin fluoborate . . . acid tin addition agent.

## ZINC PLATING

. . . ball and cast zinc anodes . . . sodium and zinc cyanide . . . zinc sulfate . . . zinc fluoborate.

## LEAD PLATING

. . . cast lead anodes . . . lead fluoborate.

## SILVER PLATING

. . . silver cyanide.

**The HARSHAW CHEMICAL Co., Cleveland 6, Ohio**

**Chicago 10, Ill. • Cincinnati 13, Ohio • Detroit 28, Mich. • Houston 11, Texas**
**Los Angeles 22, Calif. • Philadelphia 48, Pa. • Pittsburgh 22, Pa. • New York 17, N. Y.**

# NEWS of the Industry

## NEW PLANTS

**N. RANSOHOFF, INC.**, producer of equipment for surface treatment of metals, recently undertook one of the most important steps in the 36-year history of the company and its development when it moved from its original location in Elmwood, a Cincinnati, Ohio, suburb, to a much larger, completely modern plant in Hamilton, Ohio.

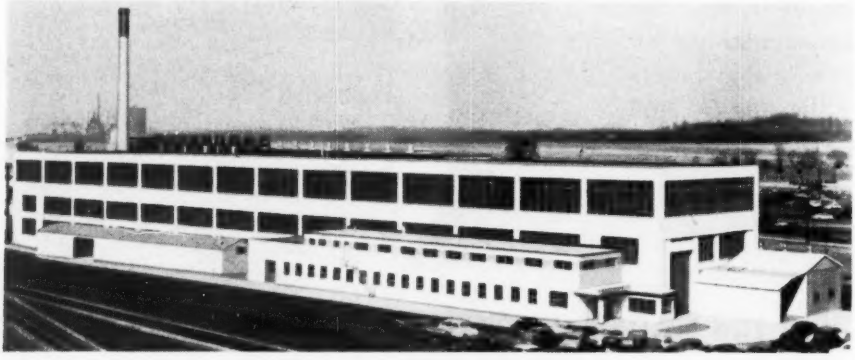
The move provides Ransohoff many advantages in greatly enlarged production facilities, and the consolidation of all administrative, engineering, experimental, and sales departments in one location.

Even though the Ransohoff post office address has been changed from Cincinnati to Hamilton, the change of location involved a move of but a few miles and has had no effect on the retention of key personnel, or experienced engineers and mechanics.

The principal component of the new plant is the expansive fabrication shop with a pillarless interior as large as a football field. Two large capacity traveling cranes serve the entire shop area. Railroad cars and trucks can load, or unload, inside the shop. One adjoining building houses a well-equipped machine shop.

Officers of the corporation are: N. Ransohoff, president; John R. Strauss, vice president and treasurer, and R. C. Wigger, secretary.

The Ransohoff Company is represented in the principal centers of the American metal working industry by the following highly experienced sales engineers: Walter H. Berger, Chicago, Ill.; Harry E. Ep-



New plant of N. Ransohoff, Inc.

Interior view of Ransohoff fabrication shop.

ley, Detroit, Mich.; James T. Hester, Willoughby, O.; Frank T. Mann, Manhasset, N. Y.; A. J. Mueller, Atlanta, Ga.; Melvin E. Robbins, Cincinnati, O.; Arthur A. Somers, Detroit, Mich.; Lyndon H. Wells, Rochester, N. Y.; and Joseph M. Shelt, Los Angeles, Calif.

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The **DEVILBISS MFG. CO., LTD.**, Canadian subsidiary of the **DEVILBISS COMPANY**, will shift manufacturing operations from Windsor, Ontario, to a new $600,000 modern plant at Barrie, Ontario, about December 1, Howard P. DeVilbiss, president of the parent company, has announced.

The Canadian plant, headed by George V. Jacquemain, president, now manufactures the complete line of DeVilbiss atomizers and spray painting equipment for distribution in the Canadian market.

The move to Barrie will give the company increased manufacturing facilities with the new plant covering 63,800 square feet as compared to 42,000 in two plants located in Windsor. It also will provide for consolidation of manufacturing and general offices in one building.

This new modern factory and office building is a single story and will have uniform glare-free lighting throughout. The structure will be well insulated for comfortable working conditions and will have a flat roof designed to support a three-inch pool of water in warm weather. The plant is located on the Toronto-Barrie Controlled Access Highway and is being laid out with sidings and paved drives which will be undisturbed when and if the initial structure is expanded to meet future needs.

Barrie is located about 45 miles from Toronto, the hub of Canadian transportation and industry.

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Details of a $750,000 expansion program to increase manufacturing and warehousing space at the **GLIDDEN COM-**

Architect's drawing of the new DeVilbiss Mfg. Co., Ltd., plant to be built at Barrie, Ontario, Can.

**PANY'S NUBIAN INDUSTRIAL DIVISION** in Chicago have been announced by A. D. Duncan, Glidden vice president and paint division general manager. The facilities to be added mark the fourth major increase to Nubian plants and laboratories since 1946.

Work is to begin immediately on a new three-story brick building adjoining other Nubian facilities at 1855 N. LeClaire Avenue in Chicago. When completed about the end of this year, it will add more than 100,000 sq. ft. to present facilities.

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**PITTSBURGH PLATE GLASS COMPANY** has signed contracts and will begin construction immediately on a three-story reinforced concrete structure with brick facing, to house the company's paint division research laboratories at Springdale, Pa.

Located about 14 miles from downtown Pittsburgh, the building is designed to harmonize with the company's adjacent streamlined paint manufacturing plant. Approximately 68,000 square feet of floor space will be available for laboratory facilities.

The laboratory will be staffed by approximately 60 people, many of whom will be highly skilled technicians to be transferred from Pittsburgh Plate's present research laboratories located in Milwaukee. The technical group will be augmented by locally recruited laboratory assistants, mechanical and clerical personnel.

Pittsburgh Plate Glass Company's basic paint research program will be centered at the new Springdale location. The paint division's technical department, however, with headquarters at Milwaukee and branches at each of the firm's paint producing plants, will continue to function at present locations.

In addition to the Springdale and Milwaukee operations, the company operates paint manufacturing plants at Detroit; Torrance, Calif.; Portland, Ore.; Houston, Texas; Dayton and Cleveland, Ohio; Newark, N. J.; Pittsburgh and Atlanta.

## COMPANIES

Record sales for Du Pont industrial finishes this year were forecast by William P. Fisher, industrial sales manager, **E. I.**


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Electroplating, Anodizing
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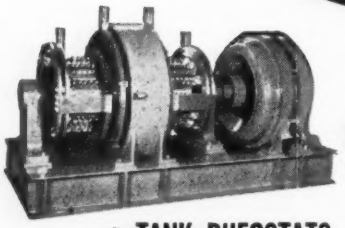

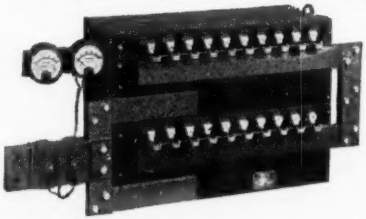

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OSBORN

## 14 minutes by hand . . .
## Now 3 minutes with push-button brushing

**This strip act** with Osborn wire brushes is taking off costly hours in the production of d-c motor armatures . . . typical of savings being discovered throughout industry with push-button brushing methods.

The job here is to remove enamel insulation from copper wires to assure top quality soldered connections. Formerly done by a tedious hand-scraping method, the time per armature was 14½ minutes. With the motor-driven brushing device shown the time has been cut to 3 minutes. As the armature is turned, a pair of Osborn Disc Center wire brush heads rotate downward on the wires and the insulation comes off clean.

This is typical of thousands of production jobs which have been simplified with the help of the **O**sborn **B**rushing **A**nalyst. For help to improve *your* cleaning, finishing or deburring operations, call your **OBA** or write *The Osborn Manufacturing Company, Dept. O-8, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

***FREE:*** New booklet on deburring with Osborn Power Brushing. Write for your copy.

Osborn Brushes

**OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES**

**DuPONT De NEMOURS & COMPANY,** at the annual industrial finishes sales meeting held recently at the Marshall Laboratory in Philadelphia, the company's research center.

He pointed to a large increase in appliance finishes and a substantial jump in furniture finishes so far in 1953 and declared that there was, in his opinion, no reason to expect less than a normal sales volume for the remainder of the year.

"Although many economists and authorities on business conditions are predicting a slackening in manufacturing output as the year progresses," Mr. Fisher said, "our own barometer does not show this up to the present time. Sales of our industrial finishes, embracing a range of over 8,000 specialized compositions, to a cross section of industry have always proved to be a good indication of the state of business."

The sales manager reported a recent survey of the refrigerator industry showed that Du Pont "Dulux" alkyd resin finish had been applied to 36 million refrigerators since it was introduced in 1932.

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**BINKS MANUFACTURING COMPANY,** Chicago 12, Illinois, maker of industrial spray painting equipment, has solved the problem of protecting delicate spray gun nozzles with a small cylindrical container of polystyrene plastic.

Binks precision nozzles are small units machined to close tolerances, therefore packaging must provide protection. The container must stand up under the usual rough treatment expected in handling and shipping and at the same time, it must safeguard the parts. The content has to be immediately identifiable because of the wide range of sizes and types.

A comparison of the old and the new Binks containers shows at a glance, the display value added through the use of attractive plastic package. Machined surfaces are unharmed by the softer body of the plastic cylinder.

A positioning pin in the base of the new Binks container and a restraining collar in the self-locking cover protect the delicate nozzle from shock damage.

Until now cylindrical cardboard boxes have been used. The nozzle was hand wrapped in heavy paper to give it a snug fit and to protect it. Sealing was also a hand job consisting of the application of acetate tape printed with the Binks name. The nozzle number was stamped on the top of each box to identify the content. The whole operation was time consuming and protection was only fair. Aware that plastics were meeting many needs, Binks took the problem to Continental Plastics Corporation of Chicago. The result is a truly unique engineered container.

This rugged but highly attractive "showcase" is made of Monsanto's L-2020, PIX-5 Crystal Lustrex L (Polystyrene). It's a clear transparent, plastic, molded into a cylindrical container which consists of a base and a self-locking cover. Molded into the base is a positioning pin which centers the material passage of the nozzle. The self-locking cover contains a restraining collar which completely protects the delicate precision orifice. Where the machined surfaces of the nozzle come in contact with the plastic base they are unharmed because the plastic is much softer than the steel nozzle. Even if the unit is accidentally dropped, no harm can come to its precision parts.

The new package makes an exceptionally attractive display. The contents can be seen from all sides. The identifying catalog number stamped into the nozzle can be easily read through the container.

The appointment of **DEAN MATERIAL & SUPPLY CORP.**, Solvay, New York, as an MD distributor, has been announced by **METALS DISINTEGRATING COMPANY, INC.**, Elizabeth, New Jersey, manufacturer of metal pigments, metal powders and metal abrasives.

Dean Material & Supply Corp. will serve as a distributor of MD aluminum pastes and powders and MD gold bronze powders in Central New York State and as a distributor of metal abrasives for the Harrison Abrasive Division of MD in the central and western section of the State of New York.

The improvement in contact and service resulting from this new arrangement is in keeping with the Company's policy of extending continued efforts to provide better products, better service and better technical assistance to users of metal pigments and metal abrasives.

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Charles W. Engelhard, president of **BAKER & CO., INC.**, and of the other companies in the Engelhard Industries group, recently announced the establishment of a Pacific Division with headquarters in San Francisco and an office in Los Angeles. The purpose is to coordinate and expand the sales and service activities of seven companies of the group in the growing markets of the West Coast.

Baker & Co. has maintained a San Francisco office for more than a quarter century. **HANOVIA CHEMICAL & MANUFACTURING CO.**, maker of ultraviolet lamps and other products, has been represented there for a shorter period. With these as the nucleus the Pacific Division will be expanded to include five other companies in the Englehard group.

They are **THE AMERICAN PLATINUM WORKS**, manufacturer of silver in all forms for industry and the arts, as well as refiner of the platinum metals; **AMERSIL CO.**, manufacturer of fused quartz for industrial and laboratory uses; **CHARLES ENGLEHARD, INC.**, manufacturer of pyrometers and other measuring devices; **IRVINGTON SMELTING & REFINING CO.**, gold refiner and manufacturer of copper sulphate, and the **D. E. MAKEPEACE CO. DIVISION OF UNION PLATE & WIRE CO.**, manufacturer of rolled gold and gold filled products for the jewelry and optical industries. With the exception of the Makepeace Co. which has its plant in Attleboro, Mass., all these companies are based in the Newark area.

The American Platinum Works will continue to distribute Silvaloy brazing products through Pacific Metals Company, Ltd., of San Francisco, in Arizona, California, Nevada, Utah and Hawaii, and through the Eagle Metals Company of Seattle, in Idaho, Oregon, Washington and Alaska.

**THOMAS G. FERRUGGIA**, who has been appointed general manager of the new division, will make his headquarters at 760 Market St., San Francisco; and **WILLIAM SCHMIDT, JR.**, will be in charge of an office at 1111 Wilshire Boulevard, Los Angeles.

Thomas G. Ferruggia

Mr. Ferruggia joined the Hanovia company in 1936. Following ten years in sales and other executive capacities, he has spent the past four years assisting in the formation of Englehard companies and agencies in South America and Australia. Mr. Schmidt has been with The American Platinum Works for the past ten years in various sales positions.

---

Appointment of Metals Finishing Corporation, 836 East Ten Mile Road, Hazel Park, Michigan, as distributor for the Honite line of barrel finishing products has been announced by the manufacturer, **MINNESOTA MINING AND MANUFACTURING CO.**, St. Paul, Minnesota.

The firm, headed by Harvey Beggs, president, has operated a barrel finishing shop for the past eight years. Sales manager for the company is Cranston Jones.

Serving adjacent areas of Ohio and Indiana as well as the state of Michigan, the firm will distribute Honite barrel finishing equipment, Honite and Super Honite chips and Honite compounds.

Among services provided are engineering and sample processing to determine proper application of the barrel finishing process in a customer's plant; sales engineering of complete barrel finishing installations; and job shop or custom barrel finishing work.

C. H. McAleer

The McAleer line of products, a well-known line dating back to 1923, is now back in the hands of its original owner, C. H. McAleer, president of **DETROIT CHEMICAL SPECIALTIES, INC.,** 101 S. Waterman, Detroit.

A complete line of McAleer products, including liquid polishes, waxes, polishing and buffing compounds for the plating industry, rubbing compounds, and other chemical specialties, will be sold nationally direct to the trade and through distributors.

The McAleer Manufacturing Company was organized 30 years ago to supply car manufacturers with original lacquer rubbing compounds and polishing and buffing compounds, eventually used by the entire industry. Mr. McAleer sold his interests in 1940.

He returned to the field in 1946, when he founded Detroit Chemical Specialties, Inc., with the "Detroit" line of polishing and buffing compounds and allied products. The company will continue with this line, along with the McAleer line.

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**INTERCHEMICAL CORPORATION,** manufacturer of printing inks, industrial finishes, textile colorants and other chemical coatings, has announced the establishment of a commercial research department. The new organization will consolidate activities carried on informally in the past by other departments and will be staffed by a group with broad experience in Interchemical problems.

The activities of the new department will be:

1. Investigating the commercial possibilities of additional products or new ideas which offer opportunities for diversification and expansion.
2. Implementing the disposition of products or developments which appear to have merit but which do not appear suitable or attractive for exploitation by Interchemical.
3. Carrying forward the development of new products or projects until they are sent to operating divisions.

**DR. ZENO WICKS,** former member of the Interchemical Research Laboratories, is manager of the new department, reporting to Norman Cassel, Interchemical vice president concerned with research and development. His associates are **HENRY YOUNG** and **JOHN DUANE,** with **MILTON ZUCKER** serving as active consultant.

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A special edition of "The Norton Spirit," company newspaper of the **NORTON COMPANY,** Worcester, Mass., describing in story and pictures what happened at Norton when the tornado struck on June 9, and what was accomplished in the following 10 days to get back into production, is being distributed.

In an accompanying letter, Milton P. Higgins, president of Norton Company, stated that only minor damage was suffered by the Abrasive Division, so that all production and deliveries of grinding wheels and refractories continued on a normal basis.

In the Machine Division almost all of the employees had returned to work within 10 days after the disaster, and all major production areas were at work shortly thereafter. The roof of the Machine Division was blown clear of the plant, and for that reason comparatively few of the employees were injured, and only minor damage to plant machinery was experienced. Within 10 days contractors had nearly completed repairs which would make the plant usable for full production.

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According to an announcement from F. A. Weihe, Jr., president, the **McALEER MFG. CO.,** has changed its corporate name to the **GOODISON MANUFACTURING CO., INC.**

Formerly the manufacturer of polishes, other protective maintenance and refinishing materials, and industrial buffing and polishing compounds, the company now will manufacture industrial buffing and polishing compounds exclusively.

Management and personnel remain the same, and the field organization continues to handle all sales. All products carry the Goodison name.

The main office and plant are at 4393 Orion, Rochester (Goodison), Michigan.

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At the A.E.S. Convention, held recently in Philadelphia, each lady who was

John F. Siefen, (left foreground) presents a pair of wrist watches to Mrs. Joe H. Farmer, while Mr. Farmer (right) looks on approvingly. Also watching the presentation (background of photo) are some of the members of the Siefen organization. They are (left to right): Harvey Blizzard, A. E. Smith, Clarence De Groat, Alfred Darnell, Alvin Seeley, and Clay Sayers.

present for the boat ride on the "Delaware Belle," received a necklace presented by the **J. J. SIEFEN COMPANY,** Detroit supplier of buffing and polishing compounds and equipment. With each necklace, each lady received a numbered ticket, a duplicate ticket being entered in a raffle from which the winning ticket was selected. The winner of this raffle received a pair of wrist watches, one for the winning lady and one for her husband, also presented by the J. J. Siefen Company.

Winner of the raffle was Mrs. Joe H. Farmer of Saginaw, Michigan. Mr. Farmer is associated with the Lufkin Rule Company. Mr. Farmer has been a member of the American Electroplaters' Society for many years, and he and Mrs. Farmer have attended many A.E.S. conventions.

## NEW POSITIONS

Eugene E. Morton, president of the Carpenter-Morton Co., Everett, Mass., has announced the recent election of the following new directors and officers.

**MORTON GOODSPEED** . . . director. Mr. Goodspeed is a grandson of one of the founders of the business. He is president of William Iselin & Co., Inc., of New York City.

**WILLIAM E. FIERMAN** . . . general manager. Mr. Fierman joined the company in 1913. He has previously held the position of collection manager and assistant treasurer. He was elected a director in 1940 and treasurer in 1949.

**FLOYD E. LEVER** . . . vice-president and director. Mr. Lever joined the company in 1948 after having had extended experience in paint manufacturing. He has held the position of manager of trade sales, and will now, in his capacity as director, be in charge of the Trade Sales Division.

**PETER J. STAPLETON** . . . director and secretary. Mr. Stapleton joined the company in 1918. He served as collection manager, before joining the sales department as sales representative in the Boston area. More recently he has acted as sales coordinator. In his new position he will be a director in charge of the Everett sales office.

**GORDON W. MENGES** . . . vice president and director. Mr. Menges joined the Carpenter-Morton Company in 1948 as a member of its technical staff. Later he was appointed head of production. In his new capacity he will be in charge of production and industrial sales development.

**JOHN G. LEGG** . . . director. Mr. Legg is president of the F. E. Spencer Company, operater of a chain of wholesale and retail paint and wallpaper stores, with headquarters in New Haven, Conn.

Carpenter-Morton Company manufactures Carmote paints and varnishes at the factory in Everett, Mass. Branch offices are located in Boston, Newark, Chicago, Detroit and Buffalo.

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The Metal Finishing Division, Frederic B. Stevens, Inc., Detroit, has added **ROBERT H. HOFF** to the sales staff in Southern Michigan. Mr. Hoff, a chemical engineer, was employed as a sales engineer by Grow Solvent Co., Detroit, before joining the Stevens organization.

He attended the Illinois Institute of

Robert H. Hoff (left), Jack B. Bisanz, Guy A. Cummings.

Technology and graduated from University of Detroit.

He is a member of the Detroit Chapter, American Chemical Society, and American Electroplaters' Society.

**JACK B. BISANZ** has been appointed sales engineer, covering Eastern Michigan and Northern Ohio, for the Foundry Products Division. He will operate from Flint, Michigan, and the Stevens offices in Detroit.

Prior to joining Stevens, Mr. Bisanz was employed as an instrument sales engineer. Before that he was employed at Buick Motor Division and General Motors Process Development Division.

Mr. Bisanz is a graduate of G. M. Tech, Flint, Michigan, and also obtained a degree in Industrial Management from Northwestern University. He is also a graduate of Flint Junior College, Flint, Michigan.

Mr. Bisanz is a member of the Frankenmuth Chapter, American Foundryman's Society, Delta Sigma Nu, national professional business fraternity, and the U. S. Air Force Reserve.

The appointment of **GUY A. CUMMINGS** to the newly-created position of assistant sales manager, Metal Finishing Division, has been announced by Stevens president, W. J. Cluff. Mr. Cummings will direct sales activities for all Stevens automatic plating and processing equipment.

Mr. Cummings has been employed as a sales engineer at Stevens for seven years. Prior to joining Stevens he was employed in the Sales Department of the Sperry Gyroscope Company.

He is a graduate of Worcester Polytechnic Institute, Worcester, Massachusetts. At present he is an active member of the Detroit Chapter, American Electroplaters' Society and Engineering Society of Detroit.

Appointment of **GEORGE P. MYERS** as assistant general sales manager, Industrial Finishes, Pittsburgh Plate Glass Company, has been announced.

A native of Newark, Mr. Myers has been an industrial sales representative at the Newark Paint Division for 13 years. Affiliated with Pittsburgh Plate Glass since 1937, he will make his headquarters at the company's general offices in Pittsburgh.

---

The Newcomb-Detroit Company, manufacturer of industrial equipment, has announced the appointment of **HOWARD W. LOCKER** as chief engineer, and **KENNETH C. WOODROW** as assistant general manager.

Kenneth C. Woodrow (left), Howard W. Locker

A graduate of the University of Michigan, with a Bachelor of Science degree in Mechanical Engineering, Mr. Locker was previously associated with the Harry Ferguson Company, and the R. C. Mahon Company.

Mr. Woodrow was previously associated with the R. C. Mahon Company as assistant manager of the industrial equipment division. He is a graduate of Wayne University, with a Bachelor of Science degree in Chemical Engineering, and a member of the Detroit chapter of S. A. E.

R. K. Martin (left), Robert E. Creamer, William E. Bridgett.

Hanson - Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating equipment and supplies, has announced the appointment of **R. K. MARTIN** as sales representative for Western Michigan. His field office will be at Grand Rapids with headquarters in Detroit.

Mr. Martin comes to H-VW-M from Merchants Chemical Co., Inc., where he was an industrial sales representative. He has worked with Allison Division of General Motors as a test engineer, chemist and plating analyst; with Wright-Patterson Airforce Base as a chemist in the research and development department of the electrochemical section; and with Wyandotte Chemicals, Inc., as an industrial service representative.

He attended Wabash College, and took advance training in chemistry at the University of Dayton.

The appointments of **ROBERT E. CREAMER** as district sales manager, and **WILLIAM E. BRIDGETT** as district sales representative for Connecticut have been announced.

Mr. Creamer, whose headquarters will be at Stratford moves up from his position as H-VW-M sales representative for Connecticut. He was former supervisor of plating at U. S. Naval Air Station, Quonset Point, R. I., from 1942 to 1945.

Before World War II, Mr. Creamer worked for H-VW-M for one year at its laboratories in Matawan. He left H-VW-M to go with Andrew B. Hendryx Co., New Haven, Conn. He spent six years with the Hendryx Company where he was supervisor of plating.

Mr. Bridgett leaves H. L. Judd Co., Wallingford, Conn., where he was superintendent of finishing. He spent 18 years with the Judd Company. Mr. Bridgett attended New Haven Junior College, and served 4½ years with the U. S. Air Force during World War II.

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F. W. Bonacker, general sales manager of the Industrial Abrasive Sales Division of The Carborundum Company, Niagara Falls, New York, has announced several personnel changes. Among the changes are three retirements: **GEORGE S. ROGERS**, Buffalo District sales manager with 37 years of service; **WILLIAM T. O'MARA**, general salesman, Buffalo Sales District with 41 years; and **SAMUEL PHIPPS**, general salesman, St. Louis District after 35 years of service with Carborundum.

**GEORGE H. DENNISON** was moved up from assistant to Buffalo District sales manager.

**WILLIAM G. KETTNER, JR.** was promoted from assistant to office manager for the New York Sales District.

**C. R. STRONG**, a general salesman in the Chicago Sales District, with a territory in Wisconsin was transferred to the Peoria, Illinois territory and will sell both bonded and coated abrasives in that area. **F. H. GARSKE, JR., A. G. OTT** and **J. H. SPEHR** will service the Wisconsin territory formerly served by Mr. Strong.

**M. I. JOHNSON**, formerly bonded field sales engineer in the Buffalo District, was made general salesman and will have the territory formerly served by Mr. O'Mara in the Buffalo District.

**G. A. TANNER**, graduate sales trainee, was promoted to general salesman and assigned to the territory formerly covered by Mr. Phipps in the St. Louis District.

**H. A. JOHNSON**, a coated abrasive salesman in the St. Louis District, was assigned the South Texas coated abrasive territory formerly covered by **S.E.H. FRANCE** who was transferred to the New York Sales District.

**H. W. McGARR**, formerly a coated abrasive salesman for the Des Moines-Davenport territory, was transferred to the Chicago District. His former territory will now be served by **R. D. HULBEN** and **C. R. STRONG**.

Clem H. Hohner

Appointment of **CLEM H. HOHNER** as district manager of the Udylite Corporation's southeast sales district has been announced by L. V. Nagle, executive vice-president of Udylite.

Mr. Hohner has been associated with Udylite for the past seven years. Prior to that time, he was with the Scripto, Inc., and Eagle Pencil Co. engineering departments. He is a graduate of the Michigan College of Mining and Technology, chemical engineering school.

Mr. Nagle also revealed that Mr. Hohner would take charge of Udylite's modern new warehouse and sales office now under construction in Atlanta. These new facilities will serve plating firms in North Carolina, South Carolina, Florida, Georgia, Alabama, and eastern Tennessee.

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Hugh V. McGuire

Jack S. Steele Company, Architects - Engineers, Philadelphia, Pa., has announced the appointment of **HUGH V. McGUIRE** as sales representative.

Mr. McGuire had been associated with the Hanson-Van Winkle-Munning Company for the past thirteen years. His work has covered export trade, graphic arts, plant process layout, and speciallized engineering sales. Mr. McGuire has an A.B. Degree from Rutgers University.

In his new position Mr. McGuire will be responsible for coordinating the newly extended engineering facilities for metal finishing which includes planning and consulting services for the process layout, as well as all utilities and building structures.

**WILLIAM B. LUTZ** has been appointed sales representative by the Rinshed-Mason Company, Detroit manufacturer of automotive and industrial paints.

Mr. Lutz, who has his B.S. in chemistry from Michigan State College and eleven years paint experience in sales, research, and development, will be responsible for industrial accounts in upper New York State.

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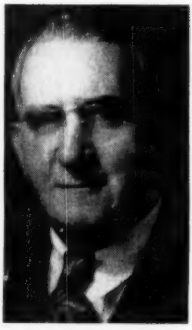

A. E. Horn

**A. E. HORN** recently retired from active duty as president of **A. C. HORN CO.**, Division of Sun Chemical Corp., and vice president of Sun Chemical.

Mr. Horn is widely known in the industry, having been vice chairman of the Executive Committee of the National Paint, Varnish and Lacquer Association. He is also a longtime member of the Steering Committee of the Products Finishing Division of the association. Mr. Horn was a former president of the Metropolitan Paint Manufacturers Association, and his activity as presidential advisor culminates many years of activity on the Executive Committee of the New York Paint and Varnish Association. He was recently a guest of honor of the A.S.T.M. after 43 years of service. He is a member of the Chemists Club and the American Chemical Society.

Mr. Horn is the founder of the Phi Epsilon Pi college fraternity which is celebrating its half-century mark.

Graduated from the College of the City of New York in 1905 with a B.S. in Chemistry, Mr. Horn was recently awarded the Alumni Medal of the college for his activities. He earned his Master's Degree in Physics at New York University.

After graduating from college he served as a newspaper reporter, a teacher of Science, and wrote the first Encyclopedia of Aeronautics for the Aeronautical Society. He won a balloon race in 1909. Many articles on kites, their history and origin, were written by Mr. Horn. He has published many scientific articles and is

regarded as an authority on the waterproofing of structures, having won recognition from the French for his contributions to the waterproofing of the ill-fated Maginot Line and the Marinot Line.

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John W. Culler

The appointment of **JOHN W. CULLER** as chief chemist has been announced by the Mansfield Paint Company, Mansfield, Ohio.

Mr. Culler received his scientific training at Ohio State and Wayne Universities. He was previously associated with Dibble Color Company, a division of Pratt & Lambert, in Detroit, and prior to this connection, he had wide experience with other paint and lacquer manufacturers.

Mr. Culler will be in charge of the research and development laboratories.

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Westley J. Tuite

Two promotions and two new appointments involving sales personnel have been announced by W. H. Brady Co., 727 West Glendale Ave., Milwaukee 12, Wis., manufacturer of wire, pipe and conduit markers and other self-sticking industrial products.

**WESTLEY J. TUITE,** formerly Chicago district manager, has been promoted to the position of general sales manager, with headquarters at the main office.

**FRED C. KLUHSMAN** has been appointed Chicago district representative, headquartering in Chicago.

**JOSEPH I. STONE,** formerly eastern district representative, has been promoted to eastern district manager, with headquarters at the Company's branch office in Newark, New Jersey.

**PAUL J. LEONARD** has been appointed mideastern district representative, with headquarters at Philadelphia.

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Korby B. Kemp

**KORBY B. KEMP** has been appointed sales representative for the Ransburg Electro - Coating Corp., in the Northeastern area, covering New England, metropolitan New York and northern New Jersey. A new member of the Ransburg Electro-Coating Corp. sales organization, Mr. Kemp has been associated with the production painting industry for the past seven years. He will use his home in Quincy, Mass., for temporary headquarters.

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**JOHN A. MARSH,** assistant vice president and manager of operating department of The International Nickel Company, Inc., has been elected vice president of the company, according to an announcement by Dr. John F. Thompson, chairman of the board of directors. Mr. Marsh is in general charge of all plant operations in the United States.

Born in Lake Bluff, Illinois, Mr. Marsh became associated with International Nickel as a laboratory assistant in its Huntington (West Virginia) Works following his graduation from the University of Michigan in 1928. He was transferred to the Bayonne (New Jersey) Works of the company as assistant superintendent in January, 1936. In August of the same year he became general superintendent of the Bayonne Works. Mr. Marsh was named general superintendent of the Huntington Works in September, 1942, and in June 1944, was promoted to assistant general manager.

In June 1947, he was appointed assistant to the vice president in general charge of all plant operations of the company in the United States and was transferred to the New York Office. He was named man-

ager of the operating department in January, 1952, and was elected an assistant vice president in May of the same year. Mr. Marsh was placed in general charge of all plant operations in the United States, succeeding in that capacity the late Hugh J. Fraser.

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The appointment of **WILLIAM C. TREADWELL** as sales promotion manager of Maas & Waldstein Co., Newark, N. J., Chicago and Los Angeles manufacturer of lacquer, enamel, and synthetic finishes, has been announced by G. Klinkenstein, president.

William C. Treadwell (left), Kenneth A. Smiley

Mr. Treadwell joined the organization in 1936 and has served as a technical service representative in the company's New England and New York State territories. His experience in the sale of product finishes has been an invaluable asset to the company's many customers who depended on him for assistance.

Operating from the company's main office in Newark. N. J., Mr. Treadwell will help supervise the activity of the company's salesmen in the Northeastern United States.

Also announced was the addition of **KENNETH A. SMILEY** to the Maas & Waldstein staff. Mr. Smiley will serve as technical service representative in the Western New York State territory. He is experienced in the field of specialized production finishes, and has just completed a training course in the company's research and development laboratories and pilot plant to become well informed on the many Maas & Waldstein products.

Appointment of **CARROLL O. HUTCHINSON** as assistant sales manager of the Glidden Company's Nubian Industrial Division in Chicago has been announced by A. D. Duncan, Glidden vice president, and varnish division general manager.

Carroll O. Hutchinson

Mr. Hutchinson will serve in his new capacity until October 31, when he will take on the duties of sales manager, the position now held by Nat Armel. Mr. Armel, who reached retirement age in January, will remain in active service until October 31.

A chemical engineering graduate of the University of Cincinnati, Mr. Hutchinson joined Glidden in 1945 as technical service director of the Nubian region. Earlier, he was assistant chief chemist of a large pigment concern, and served as a Captain in the Office of the Chief of Ordnance, where he helped develop protective coatings for ammunition during the war.

"Mr. Hutchinson played an important part in the postwar growth of our industrial business," said Mr. Duncan in announcing the appointment.

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Cowles Chemical Company, Cleveland, Ohio, has announced the appointment of **GEORGE E. PARISHO** as Cowles technical man in the Metal Cleaner Department for the sales territory of southern Illinois and St. Louis, Missouri.

George E. Parisho

George Parisho is well qualified to give valuable assistance to industrial metal working companies, having had extensive experience in metal working and finishing industries.

Following a recent meeting of the board of directors of Oakite Products, Inc., manufacturer of industrial cleaning and allied materials, five changes in the management organization of the company were announced. **H. LIGGETT GRAY**, former vice president, was elected to the office of second vice president, in which position he will have broad responsibilities in matters pertainng to overall management functions, in addition to general supervisory duties in connection with manufacturing operations. At the same meeting, **FRANK L. OLDROYD** was named vice president, a post he will hold in addition to his present positon as general sales manager of the company's industrial division. Also elected vice presidents were **EUSTACE LINGLE** and **VAN DORN C. SMITH**. The former will continue to cooperate with the general sales manager in the direction and guidance of the firm's sales organization, and will be responsible for the functioning of its engineering, technical service and sales development departments, while the latter's duties will involve consultation work of a general technical and sales nature. Another change announced was the election of **GEORGE M. SEIB**, assistant manager, to the office of secretary of the company. In addition to his new duties, he will continue to supervise personnel department operations and be responsible for general office administration.

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Charles R. Van Riper

**CHARLES R. VAN RIPER** has been appointed district sales engineer by Norton Company for the Chicago district.

Mr. Van Riper will organize and direct field engineering activities in Chicago, reporting to that area's district manager, Raymond E. Taylor. Norton's district office is located at 4737 South Christiana Avenue.

Born in Pompton Plains, New Jersey, Mr. Van Riper holds a degree in mechanical engineering from Stevens Institute of Technology. He joined Norton Company in 1929. Following a sales training course, he worked in the Industrial Engineering department of the Grinding Machine Division, Planning and Sales Engineering departments of the Abrasive Division, and since 1941 had been in the Research and Development department — most recently as a field service engineer.

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**CHARLES A. HIGGINS** has resigned as chairman of the board of Hercules Powder Company, a post he had held since 1944. He also resigned as a member of the company's finance committee, but remaineu a member of the Hercules' board of directors.

**ANSON B. NIXON**, a vice president of the chemical company since 1940, was elected by members of the board at a regular monthly meeting to succeed Mr. Higgins as chairman of the board. He resigned as a company vice president to accept the post.

At the same time, **ALBERT E. FORSTER**, president of Hercules, was elected a member of the company's finance committee, to fill the vacancy left by Mr. Higgins' resignation.

Mr. Forster was elected president of the company at a board meeting April 29, when Mr. Higgins resigned the post he had held since 1939 in keeping with the Hercules' retirement policy.

## TRAINING COURSES

Schools in industry are also feeling the effects of crowding. Because recent sessions have been filled to capacity, the **BINKS MANUFACTURING COMPANY** of Chicago is requesting reservations further ahead than ever before for its **SPRAY PAINTING SCHOOL**. Registrations are urged now for the following sessions during the fall and winter of 1953:-

September 14th through 18th
October 5th through 9th
November 2nd through 6th
December 7th through 11th.

Classes will be conducted in a specially prepared room in the main plant of the Binks Company.

The Binks School is open to all interested persons. It is especially suitable for training officials, foremen, industrial distributors and jobbers' salesmen, paint salesmen and all those who service or use spray painting equipment.

Classes are composed of men with similar interests and similar problems involving spray finishing and coating.

William Beacham, well-known spray painting authority, is in charge of the classes. The discussions and demonstrations cover all types of spray guns and equipment. Every member of the class takes spray guns apart, rebuilds them and then tests the guns. Trouble-shooting gets a lot of attention. Each student actually produces such finishing defects as blushing, blooming, orange peel, shore line, and so on and then learns how to prevent and cure these errors.

During the 5-day course, Mr. Beacham discusses such other equipment as paint circulating systems, material handling pumps, spray painting booths, oil and water extractors, and catalyst painting equipment.

No tuition is charged for the Binks School. However, classes are limited to 40 students and each student is expected to pay his own transportation and his expenses while in Chicago. Applications should be made two to four weeks in advance of class dates. All requests for enrollment should be sent to E. F. Watts, Binks Manufacturing Company, 3118-40 W. Carroll Ave., Chicago 12, Illinois.

The following schedule contains an outline of the five day course of instruction.

**MONDAY**

Basic principles of the spray gun—external and internal atomization—types of patterns and reasons therefor—pressure and siphon—nozzle combinations and reasons—types of spray guns and their use.

How to use a spray gun—preparation of paints for spraying—holding and stroke of gun—triggering—distance for different types of paint—speed of spraying—how to regulate pressures to permit savings of paint, air causes of defective spray—how to choose a spray gun.

Paints—what paint is made of and why including lacquer, enamel, synthetics, shellacs, solvents, diluents and thinners.

Reasons for rejects—blushing, blooming, dustcoats, poor adhesion, boiling and blisters. Mixing paint and blending colors.

**TUESDAY**

All members of the class take spray guns apart, reassemble them and then test spray pattern.

Change nozzle combinations and test in order to obtain a thorough understanding of actual production methods. Supervised spraying of different shaped objects which demonstrates methods of correcting production problems. Lecture covering material control; angle of spray; rhythm of operator; temperature, viscosity; solvents; and the effects produced by different types of paint.

**WEDNESDAY**

Air Compressors—showing how compressors operate with description of different types of compressors. How to choose a compressor; where to locate compressor; size of wiring and air lines. Portable compressors and what they will do.

Underbody and flow application. Pumps.

**THURSDAY**

Spraying pictures with the aid of masks so that each class member can demonstrate to himself the blending of colors, clean cut and fading operations as well as the importance of permanent records.

Use and limitations of extension guns — flock operations. The difference between production spraying and building spraying.

The reasons for types of hose, connections, pumps and pressure tanks.

Mr. Beacham explains the operation of a spray gun to one of his students, Mr. Sutheb Kusolari of Siam, at a recent session of the Spray Painting School conducted by the Binks Manufacturing Company of Chicago. This scene took place at the main plant in Chicago where the classes are held.

**FRIDAY**

Oil and water extractors and regulators and their use.

Automatic spray application.

Dry type spray booths; water wash spray booths—cleaning and maintaining—air supply—circulating systems.

Demonstration of flock application.

Questions and answers.

All of the class members' production problems are thoroughly covered during the week with all of the members benefitting from open discussions and demonstrations.

Each member is presented with a certificate suitable for framing to show he has completed the course and understands Binks Spray Painting Equipment.

## HONORS

The following awards were made June 15, 1953, by the American Electroplaters' Society in convention in Philadelphia.

The Carl E. Heussner award, the top award of the Society, to **WILLIAM C. GEISSMAN** and **ROBERT H. CARLSON** of the National Lock Company, Rockford, Illinois, for their paper "Current Distribution in Barrel Plating—A Statistical Study."

The A.E.S. Silver Medal to **R. F. LEDFORD** of Industrial Filter & Pump Mfg. Co., Chicago, Illinois, and **E. A. DOMINIK** of Lake Shore Electrotype Co., Chicago, Illinois, for their paper "Comparative Wear Characteristics of Some Electrodeposited Metals."

The A.E.S. Bronze Medal to **STANLEY L. EISLER** of Rock Island Arsenal, Rock Island, Illinois, for his paper "Radioactive Isotope Dilution Method for Determining Sulfate Concentration in Chromium Plating Baths." This is a new A.E.S. medal sponsored by the Grand Rapids Branch.

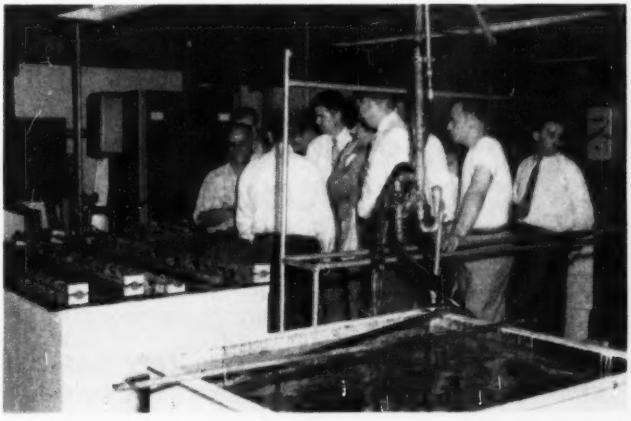
The Chromium Plating award to **LLOYD GILBERT**, Rock Island Arsenal, Rock Island, Illinois, **W. S. MORRISON** and **FLOYD H. KAHLER** of Illinois Water Treatment Co., Rockford, Illinois, for their paper "Use of Ion Exchange Resins in Purification of Chromic Acid Solutions."

The Precious Metal Plating award to **HAROLD J. WIESNER**, Bendix Aviation Corporation, South Bend, Indiana, for his paper "Some Experiences in Heavy Rhodium Plating."

## MEETINGS

The names of the committee chairmen in charge of arrangements for the **31ST ANNUAL MEETING** of the **FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS** have been announced by Howard G. Sholl, chairman of the Federation Meetings Committee.

**EUGENE H. OTT** (Cleveland Club) will arrange the business sessions of the meeting which is scheduled for October



Students of the Illinois Institute of Technology class for electroplaters tour the plant of Arrow Plating Co., Chicago. Gaining a view of practical situations is a vital part of the training of skilled men for the finishing industry. The class is led by Joseph M. Andrus, superintendent of finishing, Croname, Inc., who is president of the Chicago Branch, American Electroplaters' Society.

29, 30 and 31 at Atlantic City's Chalfonte-Haddon Hall. **HUGH A. McCONAGHIE** (Philadelphia Club) is chairman of the Paint Industries' Show Committee. The Show will run from October 27 to October 30.

The Host Committee is headed by **FRED M. DAMITZ** (New York Club). Sub-Committee chairmen include **A. J. BRUNING** (Baltimore Club), Registration Committee; **W. J. GRECO** and **W. E. SANTORO** (New York Club), Floor Committee; **A. H. STOVER** (Philadelphia Club), Banquet Committee; **J. P. HARNER** and **D. W. MUNSON** (Philadelphia Club), Dance Committee; and **MRS. R. W. CHARLTON** and **MRS. S. R. MOUNTSIER, JR.** as co-chairmen of the Ladies Entertainment Committee.

An excellent program both from a standpoint of business and entertainment is assured.

## NECROLOGY

**EDWARD C. BADEAU,** in charge of the Special Publications Section of The International Nickel Company, Inc., and editor of Inco Magazine, died recently. Mr. Badeau, who was 58, resided in New Brighton, S. I., New York.

He joined International Nickel in April, 1929. A veteran of the Mexican Border Campaign and World War I, he was first County Commander of Richmond County of the American Legion and Senior Past Commander of the James S. Slosson Post of Staten Island. After the war he was Public Relations Officer of the Near East Relief. Later he established and was Publisher and Editor of "The South Shore Times," a former Republican political publication on Staten Island. Mr. Badeau was a Past President of the International Council of Industrial Editors.

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**GEORGE C. MONTAGUE,** Norton Company's first grinding machine salesman, died recently at the age of 86. Prior to his retirement October 1, 1936, he had been selling Norton grinding wheels and grinding machines since 1898. When the company first began to make grinding machinery in 1900, Mr. Montague changed his line from oil stones and grinding wheels to the world's first line of precision grinding machinery.

When he first took to the road with


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suitcase and order book, his territory was bounded by the Atlantic and Pacific Oceans. Since then, of course, sales territories have been confined to smaller areas. In 1932, Mr. Montague was named New England district sales manager, a post he held until his retirement.

**September 6-11, 1953. 124th National Meeting, American Chemical Society,** Los Angeles, California.

**Sept. 13-16. 104th Meeting, Electrochemical Society,** Ocean Terrace Hotel, Wrightsville Beach, N. C.

**Sept 14-15. Semi-Annual Meeting, American Hot Dip Galvanizers Association, Inc.,** Hotel Statler, Cleveland, Ohio.

**Sept. 16-18. 15th Annual Shop Practice Forum, Porcelain Enamel Institute,** Ohio State Univ. and Deshler-Wallick Hotel, Columbus, Ohio.


**Modern Masking Materials and Methods for Fabrication and Spray Finishing**

**By Arthur P. Schulze**

***64 Pages*** ***47 Illustrations***

Written for department superintendents, shop foremen, process and finishing engineers . . . this manual is a source of ideas for saving time, cutting costs and getting better product quality.

*Price $1.00*

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**Sept. 21-25. Eighth National Instrument Exhibit, Instrument Society of America,** Sherman Hotel, Chicago, Illinois.

**Sept. 23-25. 56th Annual Convention of the International Association of Electrotypers & Stereotypers,** Hotel Statler, Detroit, Mich.

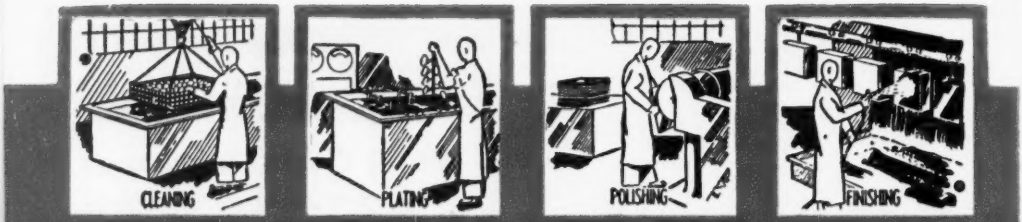
**Oct. 19-23. 35th National Metal Exposition and Congress, American Society for Metals,** Cleveland Public Auditorium, Cleveland, Ohio.

**Oct. 19-23. 41st National Safety Congress and Exposition, National Safety Council,** Chicago, Ill. Sessions on industrial safety at Conrad Hilton, Congress, Morrison, and Hamilton hotels.

**Oct. 26-28. 65th Annual Convention, National Paint, Varnish and Lacquer Association,** Chalfonte-Haddon Hall, Atlantic City, N. J. For reservations write Paint Industry Convention Bureau, 16 Central Pier, Atlantic City, N. J.

**Oct. 29-31. 31st Annual Meeting of the Federation of Paint and Varnish Production Clubs,** Chalfonte-Haddon Hall, Atlantic City, N. J.

**Nov. 30-Dec. 5. 24th Biennial Chemical Industries Show,** Commercial Museum and Convention Hall, Philadelphia, Pa.




# New • EQUIPMENT • MATERIALS • PROCESSES

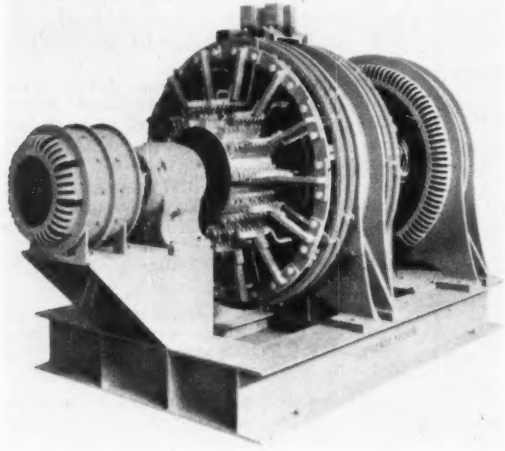
## Motor Generator Equipment

Chandeysson Electric Company, 4082 Bingham Ave., St. Louis 16, Mo., designer and manufacturer of motor-generators for over fifty years, has redesigned its line of low voltage motor-generator equipment. The new line features improved commutation, all-welded steel construction, increased accessibility and more ventilation, which results in greater overload capacity and higher overall efficiency.

Generator and exciter brushes, coils and commutator are now fully accessible for inspection, cleaning or removal, without the necessity of removing any other components. Higher overall efficiency is said to be realized with the new design which allows unrestricted air circulation around and through the generator. The exciter brushes are mounted on the inboard side to prevent accidental damage and also to insure smoother operation, thereby increasing brush life. Over-size split sleeve bearings adjacent to the commutators assure smooth operation and permit overloading without heating. Brush life is considerably increased with the new design which features sparkless commutation even at the guaranteed overload capacity of the generators.

The prime mover is a direct-connected low speed, heavy-duty, synchronous motor with either 80 per cent leading or unity power factor. Designed and built by Chandeysson, each motor is specifically designed to power the generator adequately. High pull-out torque permits smooth and efficient operation even when the generator is overloaded. Extra windings on the rotor poles produce high starting torque, permitting the use of across-the-line starting devices.

To assure unified responsibility and high quality product, the motor-generator set is completely manufactured at the Chandeysson plant. Thus the engineering integrity of design is maintained not only through specifications but also through tested engineered quality control under Chandeysson supervision.



Chandeysson Motor Generator Set

Chandeysson generators are available in sizes from 300 to 20,000 amperes at specified voltages.

## Heavy Duty Chemical-Resisting Protective Coatings

New formulations which can be spray-applied to produce extra-thick chemical-resisting coatings on steel and other metals have been developed by United Chromium, Inc., 100 E. 42nd Street, New York 17, New York. These products, identified as Unichrome 5300 Coatings, are used to protect equipment against acids, alkalies, salts, oxidizing agents, and many other corrosives.

The manufacturer states that Unichrome 5300 Coatings permit spray application of films of much greater thickness than has been obtainable in the past. The new coatings, used at room temperature, can be applied to cold vertical surfaces to produce single coat dry films up to 20 mils thick. Even at these unusual thicknesses practically no sagging is encountered. Materials previously offered for similar applications usually provided single film dry thickness of about 1 mil, seldom more than 6 mils.

Strong mineral acids such as hydrochloric and sulfuric, alkalies such as sodium and potassium hydroxides, water, salt solutions, oxidizing and reducing agents, and many wetting agents do not attack Unichrome 5300 Coatings. Special formulations can be supplied that are odorless, tasteless, and non-toxic, making them suitable for use in contact with edible products.

Unichrome 5300 Coatings are usually applied over a special primer. Both the primer and the coating require short bakes at a temperature of 350 deg. F. The coatings cannot be air dried.

In the short time they have been available, Unichrome 5300 Coatings have been used for tank and duct lining work in the plating industry. The manufacturer states that the coatings may be used to protect many other types of equipment in the chemical, pharmaceutical, metal working, food, and beverage industries.

## No. 100 CS Vapor Degreaser

A compact combination vapor degreasing unit is being produced by Phillips Manufacturing Co., 3457 West Touhy Avenue, Chicago 45, Illinois. The new unit is capable of degreasing 200 pounds of work per hour either in baskets or as individual pieces.

The unit, the No. 100 CS, incorporates cool rinse, hot rinse and vapor degreasing because it has both a rinse and boiling sump along with a water jacketed vapor area. Distilled solvent is collected by means of a condensate return trough, passed through a water separator and returned to the rinse sump. The boiling sump is fed by overflow from the rinse sump.

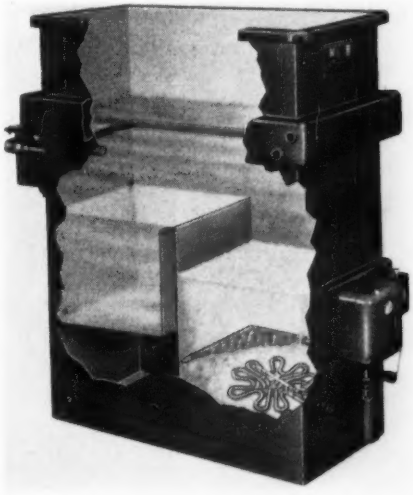
Heating is electrical and the unit is available for the following current characteristics: 220 volt, 60 cycle, single phase; 220 volt, 60 cycle, 3 phase; 440 volt, 60 cycle, 3 phase; 550 volt, 60 cycle, 3 phase; 110 volt, 60 cycle, single phase.

Size of the unit is 38 inches long by 18 inches wide, by 42 inches high. It is constructed of 14 gauge steel structurally reinforced and arc welded, and hot dip galvanized.

A 3,000 watt cloverleaf type Calrod unit, located in the floor of the sump, provides the heating in the No. 100 CS.

A flusher spray pump is available as optional equipment. It is installed at the time of assembly.

As a solvent recovery still, the No. 100 CS has a distillation rate of seven gallons per hour based on a 30 per cent contamination of solvent.



No. 100 CS Vapor Degreaser

## Nankervis "600" Automatic Buffing Compound Applicator

An air-operated Buffing Compound Applicator that features a variable number of applications per minute has been announced by the George L. Nankervis Company, 19255 W. Davidson Ave., Detroit 23, Michigan. Designated as the "600" Series, the new applicator is available in four models to accommodate rectangular or round compound bars.

The new applicator can be installed on all types of buffing machines from simple lathes to multi-operation automatics. Light weight construction—less than 18 pounds—permits installation on floating heads without disturbing balance. It can be installed in any position without effecting operation.

Key feature of the new applicator is its ability to feed any number of strokes per minute, applying compound only when required. For example, it can be installed so as to apply compound only during the buffing cycle, withdrawing while the work changes from station to station in the machine. In addition, it is also possible to operate up to eight applicators simultaneously from a single controlling valve, applying compound uniformly to all buffs. With each application, the compound is fed forward to compensate for "wear down" of the bar. The rate of feed is adjustable from 0.0015 to 0.015 inch per stroke.

Major parts of the applicator are fabricated from cast aluminum to minimize overall weight. All operating parts are covered to seal out dirt, wheel lint and compound. Moving parts are bearing mounted to insure trouble-free service and smooth operation.

Substantial savings in buffing costs have been reported by users through increased buff life, compound savings, and reduction in labor.

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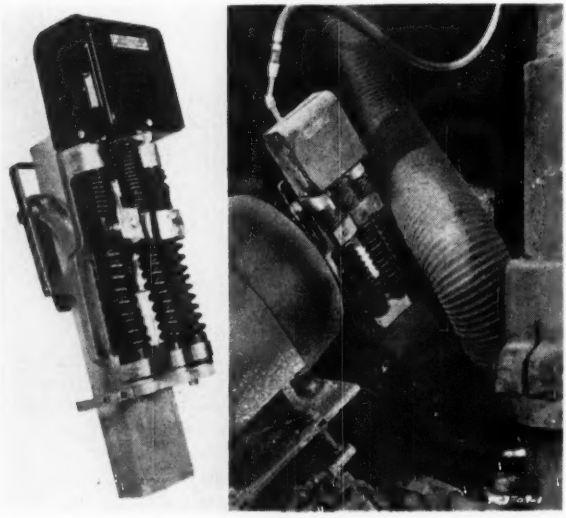
## Sel-Rex Copper Purifier

A Copper Purifier, which eliminates the need for periodic dumping of copper plating baths by removing harmful solution breakdown impurities and converting them to useful cyanides, has been announced by Sel-Rex Precious Metals, Inc., 229 Main St., Belleville 9, N. J. Sel-Rex Copper Purifier is described as a concentrated solution of pure salt prepared especially for use in cyanide copper plating solutions. It is a unique product since it adds no impurities to the bath and fills an important need in the copper plating field.

The Copper Purifier precipitates carbonates, chromates and sulfates as a heavy, dense insoluble precipitate while converting them to useful cyanides. The precipitate can be filtered out, or the solution can be decanted off the precipitate.

The manufacturer states that the addition of Sel-Rex Copper Purifier sharply reduces cyanide consumption and increases the cathode efficiency of the solution. Addition of one gallon of Copper Purifier will remove at least 38 ounces of sodium carbonate or 50 ounces of potassium carbonate. It will increase the sodium cyanide content of the bath by at least 35 ounces or the potassium cyanide content by at least 47 ounces.



Nankervis "600" Automatic Compound Applicator—studio view (left); Nankervis "600" Automatic Compound Applicator in operation.

## Model BTD Twin Bench Tumbling Barrel

The Espec Twin Bench Tumbling Barrel manufactured by Tumbling Sales & Service Co., King Street, Greenwich, Conn., is stated to combine the advantages of closed horizontal tumbling action with bench barrel size, and at the same time provide high production capacity for processing small parts.

A choice of four sizes of drums enables the user to select the size which exactly meets his individual requirements. Three different sizes of machine permit the selection of the one best adapted to the loads involved.

Single speed machines are regularly offered with a choice of 15, 20, 25 or 30 r.p.m. drum speeds, but lower or higher speeds are available on special order. Three speed machines are equipped with three-step pulleys and can be supplied with either of the following combinations: 13, 22 and 38 r.p.m.; or 16, 27 and 47 r.p.m. Variable speed machines equipped with Lovejoy Drives can be supplied with almost any combination of speeds based on a ratio of 2.75 to 1.

The barrel is equipped with a ¼ h.p. motor, 115 or 230 volt single phase, 60 cycle, with cord, plug and switch. Overall dimensions are approximately 24 inches wide by 23 inches deep.

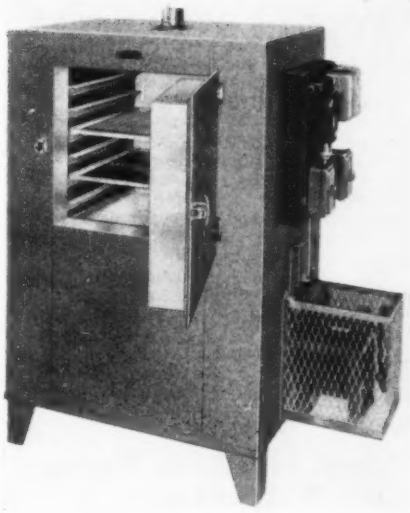
## Heat Resisting Aluminum Paint

Heat resisting aluminum paint, designated as Super Hot, has been announced by Sheffield Bronze Paint Corp., 17814 Waterloo Road, Cleveland 19, Ohio.

The manufacturer states that Super Hot aluminum paint can be applied to any metal surface subject to temperatures up to 1600 deg. F. The paint will not dull or turn brown in use at temperatures below 1600 deg. F., it is claimed. The material can be applied by brushing, spraying or dipping and will air dry within 30 minutes. The paint may be applied to either cold or warm surfaces but its application to hot surfaces is not recommended. In ordinary circumstances, one coat of Super Hot provides adequate coverage.

## Grieve-Hendry Cabinet Oven

Grieve-Hendry Co., Inc., 1811-19 W. Lake St., Chicago 12, Illinois, has announced the introduction of a line of cabinet ovens for closely controlled production and laboratory use. Design and engineering are claimed to make possible closer control of uniform temperature, better performance and greater economy of operation.



Grieve-Hendry Cabinet Oven

The ovens are equipped with a high-pressure, motor-driven blower which propels heated air in a definite air-flow pattern through the work chamber. This is stated to prevent any disturbance due to radiant heat and assure temperature uniformity.

Other features include: indicating temperature control; high volume adjustable air-flow; high low heat switch for close control and quick recovery; Inconel-sheathed heating elements; manual interlock for purge period operation of blower without heat; electrical interlock for turn-off of heat in case of blower motor failure; adjustable, positive exhaust and intake.

The shell construction is 18 and 20 gauge oven steel reinforced and welded. Insulated with Fiberglas, the interior of the cabinets is finished in 1000 deg. silicone aluminum paint. Exterior finish is gray wrinkle.

Available in either horizontal or vertical flow the cabinet ovens handle temperatures to 650 deg. F. and 850 deg. F. for 220 or 440 volt operation.

## "Quick Pik" Dry Acid Pickle

The Mitchell-Bradford Chemical Company, 2446D Main Street, Stratford, Connecticut, has announced a new product "Quick-Pik," a dry acidic salt mixture which when mixed in the proportions of two pounds "Quick-Pik" salts per gallon of water will quickly remove scale and rust. The solution can be used at temperatures of 70 to 150 deg. F.

Because Quick-Pik is furnished as a dry salt mixture, it can be safely handled.

Quick-Pik also has incorporated in the formulation an inhibitor and also a foaming agent which minimizes the attack of the acid on the base metal and produces a foam which covers the surface of the Quick-Pik solution eliminating acid spray and reducing fumes to a minimum.

## Small Parts Power Washing Machine

G. S. Blakeslee & Co., 1844 S. 52nd Ave., Chicago 50, Illinois, parts washer and degreasing machine manufacturer, offers a standard small parts power washing machine designed for low production jobs or for cleaning between operations. A standard unit, tank and tables are so arranged that two units can be teamed together for a wash-and-rinse operation. It is equipped with a wheel roller conveyor, designed for standard work baskets, and incorporates all the quality features found in the more expensive high-production conveyorized-power washing machines.

This same unit can be furnished with the Blakeslee special Niagara Paddle Wheel instead of a pump. This arrangement is ideal for screw machine work, where a great amount of chips must be removed and the job specifies a large solution volume at a low head. This standard unit can be furnished for steam, gas or electric heat. In addition to all this flexibility the unit can be furnished in explosion proof construction for use with petroleum solvents.

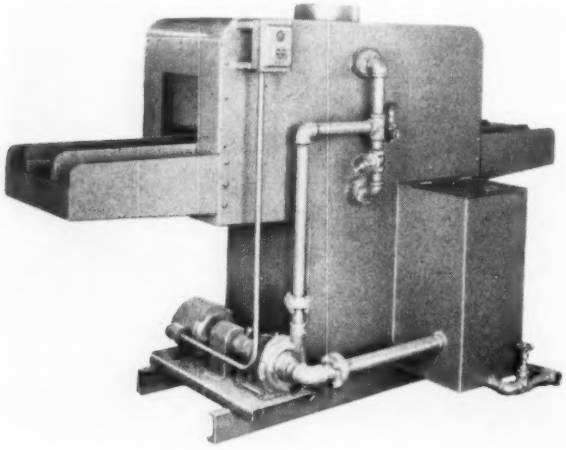
## Kote-Rax Grade L

Hanson-Van Winkle-Munning Co., Matawan, N. J., has announced a new coating for insulating and protecting racks, fixtures and anode hooks used in electroplating baths. The purpose of the coating material is to prevent metal from plating onto or off of the racks, fixtures and hooks during electro-processing. Kote-Rax Grade L, a plastisol coating, is specially formulated to reduce maintenance cost.

Because it is unusually tough and ductile, the Grade L coating will withstand rough treatment and abuse, and will wear longer both in and out of the plating bath. It has a dielectric strength of 600V per one mil thickness at thicknesses of 20 to 25 thousandths of an inch; and a dielectric strength of 125 to 150V per one mil thickness at thicknesses up to ⅛ inch.

A smoother, more stable coating, Kote-Rax Grade L assures minimum drag-out loss; it retains its original color permanently. The original color is a light orange, which can be easily checked for aging defects. The new coating is resistant to all of the commonly-used cleaning, pickling and plating solutions.

An electroplater can easily apply Kote-Rax Grade L to his racks and fixtures. Because the coating is solvent-free,

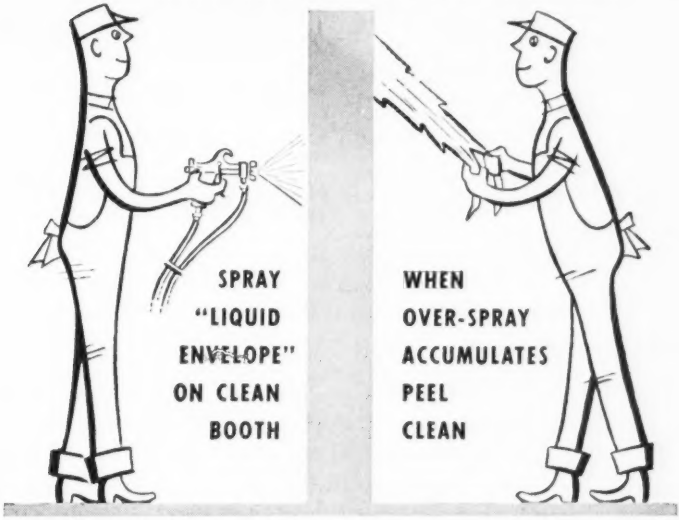


Small Parts Power Washing Machine

# easy way to keep booths clean

# "LIQUID ENVELOPE"

**STRIPPABLE PROTECTIVE PLASTIC FILM**




That's all there is to the simple, labor-saving, inexpensive "Liquid Envelope" way to keep booths firesafe, better illuminated, better ventilated. Costs far less than the outmoded hand-scraping or grease-papering methods. ***New Users:*** Order a 5 gallon Test-Sample at the drum-lot price. Hundreds of steady users found out that way. Why not you?

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no ventilating system is needed to carry away fumes. The only equipment required is a tank and a curing oven, both of which may be homemade. If the racks and fixtures are not too big they may be dipped in the Kote-Rax drums.

Before coating with Kote-Rax Grade L, a primer is applied to the racks. It may be either brushed, dipped or sprayed on. The racks and fixtures are then heated to 350 deg. F. for 10 minutes. While still hot they are dipped into the Kote-Rax Grade L until thoroughly cooled.

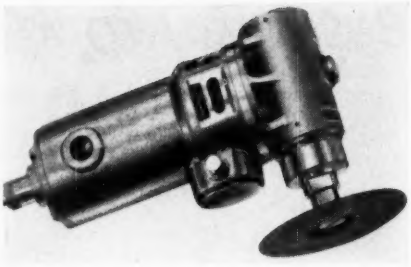
Cooling usually takes from 2 to 5 minutes, depending on the size of the racks. After cooling, the racks are lifted out of the coating material and placed in an oven. Here they are baked for 10 minutes at 350 deg. F.

If heavier insulation is desired, a second coat may be applied. The pre-heating, dipping, draining and baking processes are the same. On the second run, however, the racks and fixtures should be given a 15 instead of a 10 minute bake.

## Portable-Electric Tool Designed for High-Speed Preparation and Finishing Operations

Designated as the Diskette Model B-2, a portable-electric hand tool designed for high-speed grinding, filing, deburring, sharpening, sanding, polishing, and other preparation and finishing operations has been announced by Franklin Balmar Corp., Baltimore 11, Md. Since the unit operates at high speeds, its capacity is limited to a 4-inch disc. The tool incorporates high-grade ball bearings, an aluminum air intake cover located at the base of the tool, and a double cooling fan for maximum cooling efficiency. A universal motor for 110-120 volts a.c. or d.c. current, is said to afford the spindle shaft a no-load speed of approximately 9,000 revolutions per minute.

According to the manufacturer, the Diskette Model B-2 also incorporates a collet chuck in the spindle for various attachments, thus reducing the overhang



Diskette Model B-2 Portable-Electric Hand Tool

on certain attachments, assuring accurate centering of any attachment, and minimizing vibration during use. A special threaded adapter collet is available for use with composition discs.

## Organic Finish for Metals

A non-fading and corrosion resistant organic finish has been developed for application to aluminum, brass, steel and zinc coils in widths from ⅛ to 30 inches, 0.010 to 0.036 inch gauge, in continuous lengths by Apollo Metal Works, Dept. P7, 66th Place and South Oak Park Ave., Chicago 38, Ill. The manufacturer states that the highly attractive baked enamel type finish stands up well under forming, drawing, bending or fabricating of the metal. Tests have shown that it will not crack, chip or chalk even under abnormal use or severe weather conditions.

Typical applications vary all the way from bottle caps to metal awning covers, including wall tile, picture and mirror frames, eyelets, drapery and curtain hardware, tubing, clips, screw caps, ends and covers of fibre cans, badges, brush ferrules, buttons, switch plates, film spools, battery tops, lighting fixtures, toys, moulding and all types of rolled sections, electrical appliances, advertising specialties, hardware items, and novelties.

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Instantly loosens, tightens 95% all plugs or bungs in steel drums
Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs.
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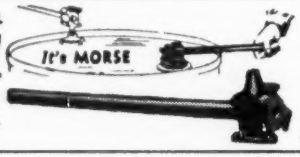


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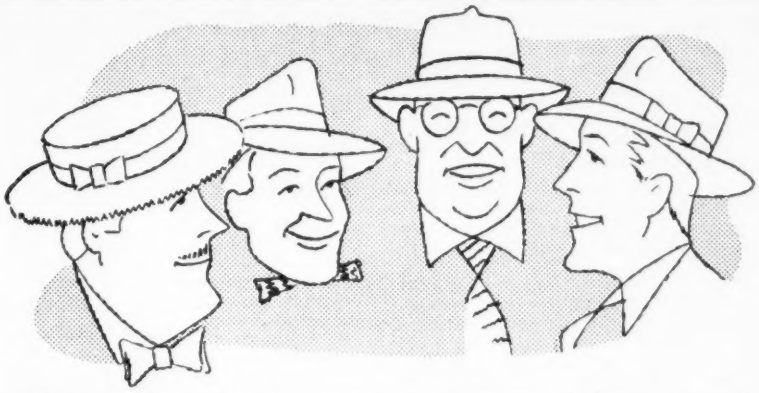

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Unlike salesmen with the single ambition to sell more goods, Sales Engineers analyze customers' problems, make expert recommendations, see the job through.

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**KLEM KLEANER No. 144**—Rapid, thorough, heavy duty still tank cleaner for ferrous metals. Removes the most difficult soil

**RUST-SOL No. 124**—Concentrated phosphoric acid surface cleaner. Removes oil and rust. Provides slight etch to promote paint adhesion. Meets USA 3-213, TAC-ES431 and MIL-C-10578

**KLEM PRODUCT of the MONTH**

**Klem Water Wash Compound No. 203**

Reduces Spray Booth maintenance costs, keeps circulation lines, water pumps, nozzles and baffles free of paint sludge. No 203 floats the paint, makes reclaiming of paint easier. Write for details

**KLEM Chemicals Inc.**
14401 LANSON . . . DEARBORN, MICHIGAN

brown, yellow, green, red, white, and black. Other colors can be specified. Surfaces are available plain or crimped.

## Clepco-Glorod Series W Immersion Heater

The manufacture of a heavy duty steel sheathed immersion heater for alkaline bath heating has been announced by the Cleveland Process Co., 7016 Euclid Ave., Cleveland 3, Ohio.

According to the manufacturer, the Clepco-Glorod Series W Immersion Heater is conservatively designed for safe operating temperature of the nickel alloy resistance element which is covered by a quartz body, claimed to be the most uniform and efficient protective conductor of heat. Low heat density protects both heater and liquids from damage due to carbonization or frying.

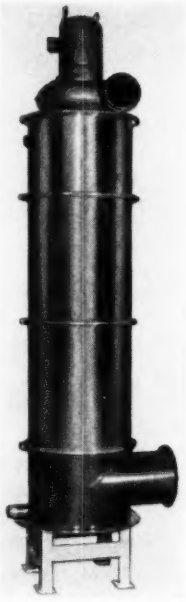
A sealed, vapor-proof Underwriter's Approved junction box prevents entrance of liquids and vapors. Units are portable, a single unit can serve many tanks and be quickly mounted over the side of the tank, or as in the case of vapor degreasers, screwed into 2 inch threaded holes in the bottom of tanks.

The heaters are available is dual voltage (230 V and 460 V), single phase in capacities of 1000, 2000, 3000, 4000, 6000, and 10,000 watts; overall lengths ranging from 14 to 70 inches. Brass or stainless steel protective sheaths can be furnished.

## Fume Washing Tower

The U. S. Stoneware Company, Process Equipment Div., Akron Ohio, has announced the development of a compact, portable, yet high performance Fume Washing Tower for general laboratory and industrial use.

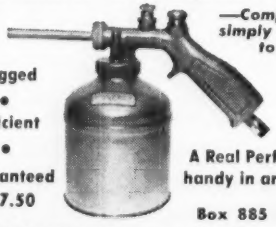
The fume washer consists of a metal stand on which the tower is supported; a bottom section containing a packing support plate, liquor drain pipe and fume intake duct; one, two, or more packed intermediate sections; a distributor section with water inlet; and a top section containing the exhaust fan, drive motor, and washed air exhaust duct. The unit is made in two standard sizes respectively: 20 inch tower diameter, which with two intermediate packed sections is 8 ft. 5 inches in height, and 30 inch tower diameter, which is 9 feet 7 inches tall with two intermediate sections. The 20 inch unit is powered with a 1 h.p., 60 cy., 220-440/v 3-phase motor, and has a rated capacity of 750 c.f.m. of air. The 30 inch unit is powered with a 2 h.p. 60 cy., 220-440/v 3-phase motor, and has a rated capacity of 1650 c.f.m. of air. The washer comes complete with motor unit, and sufficient Intalox saddle packing for the number of intermediate tower sections ordered.



Fume Washing Tower

The Fume Washer is outstanding for its light weight and use flexibilty, made possible through simplicity of construction. Of particular importance to users is the long life and low maintenance expectancy of the unit, a result of a $\frac{1}{8}$ inch coating of Tygoflex plastic which protects all metal surfaces, inside and out, from corrosion and abrasion. Tower sections are made of hot rolled, 16 gauge on 30 inch and 18 gauge on 20 inch sheet steel with 1 inch spun flanges locked together with split ring clamps. The unit is easily and quickly dismantled, moved to a new location and re-assembled. The Tygoflex coating on the tower flanges makes an airtight seal between sections without the use of supplementary gaskets other than edge taping of the flanges with a plastic tape supplied with the unit. Additional tower units may be added to the


**Portable Sandblast Gun**



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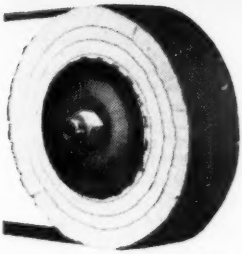
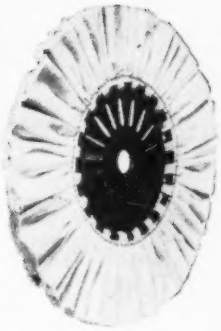


## STYLE C-20 CONTACT WHEELS

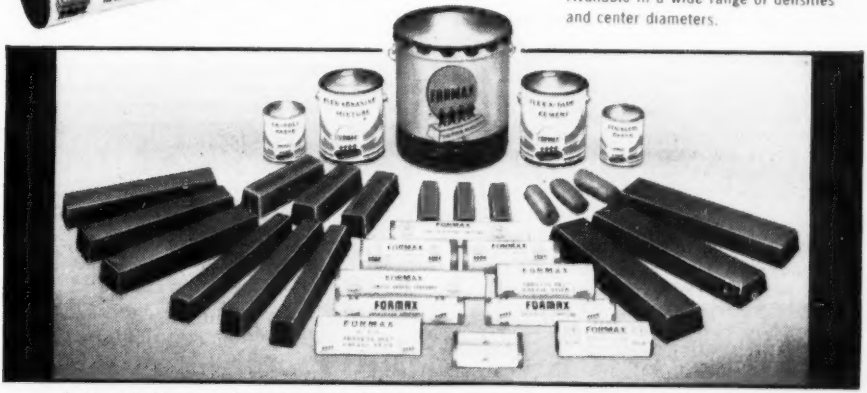
***and F-26 Belt Lubricant***

A C-20 flexible Contact Wheel will form itself to the shape of the work and permit the abrasive felt to polish contoured surfaces and F-26 Abrasive Belt Lubricant will increase belt life by preventing loading and glazing. Produces finer, smoother and brighter surfaces through lubrication.



## ZIPPO BUFFS

These famous long-wearing buffs run cool under all buffing conditions. Constructed of high count bias-cut cloth or sisal mounted on safe steel centers. Available in a wide range of densities and center diameters.




A complete line of buffing compounds in bar form as well as in liquid form for brush or spray application. Also Flex-A-Glu polishing wheel cements.

Our Laboratory and Sales Engineering staff would welcome the opportunity to be of help in solving your finishing problems.

***Send for descriptive literature***

# FORMAX MFG. CORP.

**DETROIT 7, MICHIGAN**

**"THE FOUR McALEERS"**

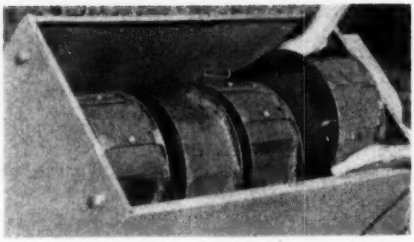
**MANUFACTURED IN CANADA BY JOHN GALLOWAY LTD., KITCHENER, ONT.**

fume washer, installed in series or parallel, to increase fume washing capacity.

The small size, yet high efficiency of the new washer is made possible by the Intalox Saddle tower packing. The unique design of Intalox Saddles provides greater randomness of packing and in a bed of given volume, exposes far more surface area to water and air than could be obtained from the same volume of any other type packing. Pressure drop is 60 to 65 per cent less than with Raschig Rings, commonly used as a packing material, further contributing to compactness and resulting in lower operating costs.

In operation, fume-laden air is drawn into the tower through the large air intake, and sucked up through the intermediate sections filled with Intalox Saddle packing. Water admitted at normal city line pressure is sprayed over the packing by the spraytight distributor. As air rises in the tower, it is scrubbed thoroughly by the descending water which absorbs the fume content. Washed air discharging from the top exhaust duct is released into the room directly, or through suitably prepared duct work. Waste water leaves the tower through the drain.

Primarily designed to wash noxious or corrosive fumes from the air in plants and laboratories, Stoneware's new fume washer serves equally well as a washer to remove irritating dusts. In such use, the Intalox packing is omitted and the dust removed by the water spray. The new washer's great use flexibility and low maintenance cost, coupled with low first cost, makes it ideal for fume washing in such operations and industries as: chemical plants and chemical processing; small organic chemical plants; laboratories; pilot plant operations; steel plants and foundries; metal grinding and polishing; electro-plating; etching; engraving, and many others.



Model LD4 Multi-Drum Finishing Barrel

## Multi-Drum Finishing Barrel

Preakness Incorporated, 972 Broad St., Newark 2, N. J., produces several designs of multi-drum finishing barrels for deburring and burnishing. These units consist of tumbling drums fitted with fiber gears. One end of the drum is removable for loading. Four or eight of these tumbling units can be operated at once in a welded steel tub by means of a center drive shaft and two idler shafts. Any tumbl-drum may be removed from the tub at any time without interfering with the operation of the remaining tumbl-drums.

Model 4D has four removable tumbl-drums. The drums are available with perforated sides for wet tumbling or solid sides for dry or wet tumbling. Solid-sided drums are also available with rubber linings for use in ball burnishing.

Model LD4 has four octagon-shaped tumbl-drums with double the capacity of Model 4D and is more practical for larger pieces or greater production.

Models are stated to take up little floor space, and come complete with electric motor and starter switch. Positive chain drive, and ball bearings provide durability. Because of the multi-drum arrangement, it is possible to finish four different pieces at the same time with different types of finishes. It is possible to tumble ferrous and non-ferrous parts at the same time.

## Agilene "CP" Pipe and Tubing

American Agile Corporation, P. O. Box 168, Bedford, Ohio, has announced the availability of a wide range of pure, un-

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**Keystone TURKISH Emery**

**FRESH SUPPLY AVAILABLE**

**KEYSTONE EMERY MILLS** *Write for Sample* **4316 Paul St., Phila., Pa.**

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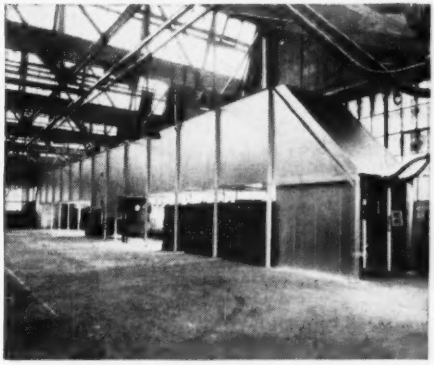
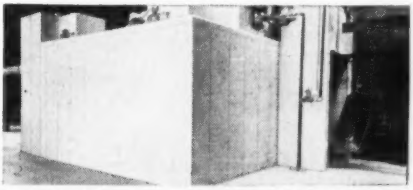
**FINISHING OVENS**

● The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being demonstrated every day in factories throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better finishing ovens.

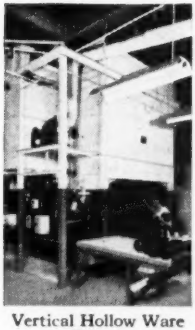


**LANLY FINISHING OVEN** Completely automatic LANLY A-Type Continuous Paint Baking Oven. Compact, built-in heating system affords rapid, uniform baking. Natural hot air seals at open ends. Space under oven can be utilized to advantage.

Two Continuous Laydown Dryers



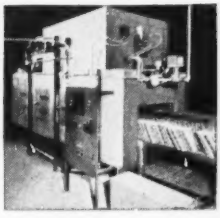
Three-Pass Oven with Air Seal Vestibules



Vertical Hollow Ware Dryer

Ceiling Suspended Continuous A-Type Paint Oven

Continuous Wicket Type Oven



LANLY
FINISHING OVENS
THE LANLY COMPANY • 760 PROSPECT AVE
CLEVELAND, OHIO

*Write for the NEW LANLY CATALOG*

pigmented, polyethylene pipe and tubing, called Agilene "CP." One, 1½ and 2 inch N.P.S. diameter pipe are now furnished in straight 20 foot lengths for easy installation. Tubing is available from ¼ to 30 inch ID with the ¼ through 1 inch diameter sizes being furnished in coils, while larger tubing is furnished in multiples of individual 4 foot sections joined by hot gas welding The wall thickness in large diameter tubing can be supplied according to customer s requirements.

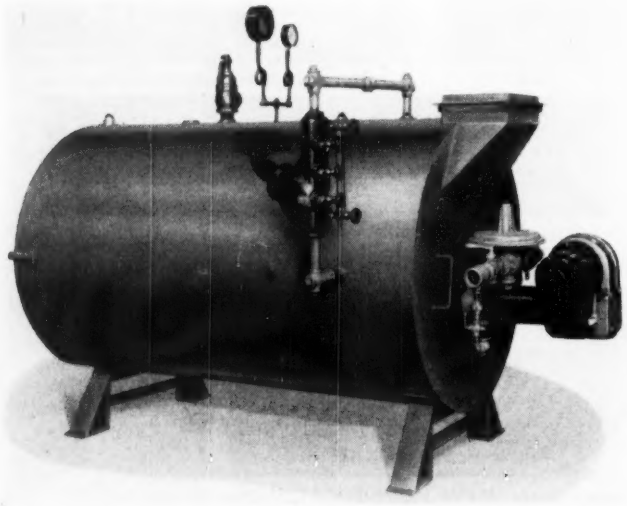
Due to the absence of any foreign matter in Agilene "CP" tubing and pipe, all the inherent exceilent chemical and electrical properties of polyethylene are retained, assuring continuous uniformity and complete freedom from contamination due to impurities. Also of interest to users will be the translucency of such tubing and piping, permitting the observation of liquid levels and general flow conditions in the pipe.

## Oil and Gas Steam Boiler

Sellers Engineering Co., 4876 North Clark St., Chicago, Ill., manufacturer of steam boilers, water heaters and other products, has announced the volume production of The Supermarine, Model LO, a combination oil and gas steam boiler. Claimed to burn gas or No. 3 oil with equal efficiency, the boiler is an advanced development of the line of twin-fuel boilers which Sellers formerly manufactured.

An internally fired marine type, it is provided with seven square feet of water backed heating surface for each boiler horsepower developed. This assures a long life of peak efficiency with either fuel, according to the manufacturer. Spark ignition is automatic on either fuel and there is no pilot. If there is either a flame or electric failure, electronic safety controls shut the burner off instantly.

The shell has a large diameter combustion tube and a battery of return tubes correctly located with respect to the firing tube. There is ample steam space with a safe depth of water.



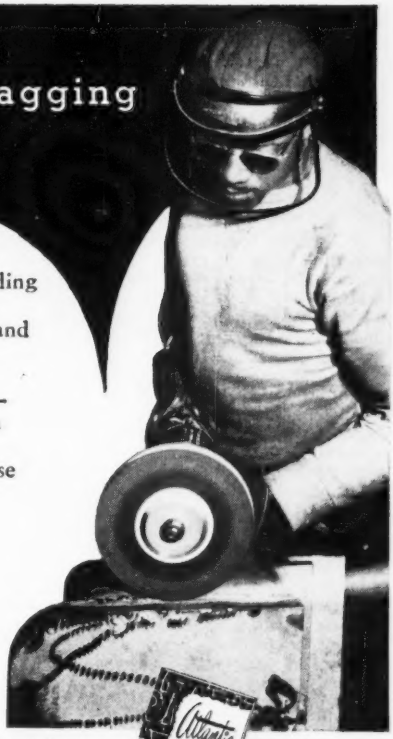
Supermarine
Model LO

## Gold Baking Lacquers

The search for new methods of producing more durable, resistant finishes to meet increasingly exacting requirements has led to large scale use of synthetic resins by the surface coatings industry. Development of a series of gold lacquers based on Epoxy resin esters, has been announced by the Watson - Standard Company, 225 Galveston Ave., Pittsburg 12, Pa. The manufacturer states that the series of coatings offers distinctive properties of resistance to chemicals, abrasion and tumbling. The coatings possess remarkable adhesion to metals, plus flexibility and toughness which make them superior fabricating coatings. They are baking types of finishes that will withstand relatively high temperatures without discoloration. Baking periods and temperatures are flexible.

This series of coatings includes both the Epoxy Resin solution and Epoxy Ester types. The use of this resin by the coatings industry is relatively new; however, field tests have proved it to

# Faster . . . Safer Snagging starts here



***Faster*** because Atlantic Speed-Tested Grinding Wheels feature a smooth, floating action that requires less pressure, reduces fatigue and speeds up snagging from start to finish.

***Safer*** because every Atlantic Wheel made — from the 2 inch size on up — is test run at a 50% higher speed than that required for normal snagging conditions . . . safer because every wheel features a special Resinoid Bond for extra strength and long life under high operating speeds.

**Lower cost,** too. Atlantic Grinding Wheels seldom have to be dressed . . . reduce downtime . . . help keep replacement costs at a minimum. Try them and see. Specify Atlantic Wheels next time you order.

**Send** for the complete, fact-packed Atlantic Grinding Wheel Catalog now. Save time . . . use the coupon.

## ATLANTIC ABRASIVE CORP.

**South Braintree 85, Massachusetts**

ATLANTIC ABRASIVE CORP.
509 Pearl St., South Braintree 85, Mass.

***Please send me the Atlantic Grinding Wheel Catalog***

**Name** .....

**Company** .....

**Street** .....

**City** ..... **State** .....

have outstanding characteristics which offer a new tool to the metal decorator.

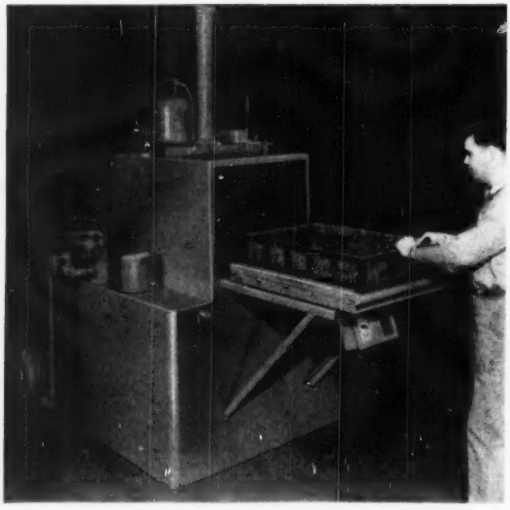
The excellent adhesion of these coatings has been proved in beer can primers, crown gold lacquers, closure coatings, can liners and pail and drum linings, the manufacturer points out.

## Automatic Washer

A line of forced circulation washers, designed to speed metal cleaning through automatic cycling by combining washing and rinsing in a single operation, has been announced by Ipsen Industries, Inc., 715 S. Main St., Rockford, Illinois. The single-stage units are claimed to completely eliminate secondary washing and extra work handling operations by employing an automatic surface spray skim-off.

Solution temperatures, work handling, and cycles for solution circulation and skim-off are controlled automatically by pre-settings on a panel located on the front of the washer. Solution heating is provided by immersion elements, available for gas, electric, or steam heating.

Of welded steel, the units are available in load capacities of 300, 400, and 700 pounds. Load platforms, with solid pans to catch drippings, are swivel-type roller units, and can be attached to either end of the washer for in-and-out operation, or to both ends for straight-through operation.



Ipsen automatic washer.

## Controlled Solution Feeder

Designed for application to the Lapp Pulsafeeder Pump, the instrumentation manufactured by the Foxboro Company,

Foxboro Dynalog pH Controller

Foxboro, Mass., permits automatic feeding of treating chemicals, either to maintain uniform concentrations or to correct variations of pH in any continuous process.

Operated by a constant speed electric motor, the Pulsafeeder Pump is controlled through a pneumatic cylinder which varies the piston stroke length to change the feed rate. This cylinder is automatically positioned by a Foxboro Dynalog Controller, depending upon whether chemicals are to be proportioned to flow or added to control the pH of the fluid.

Since transmission and control are completely pneumatic, the system of automatic feeding is stated to offer maintenance economy, accuracy, and

# Superb

Where many products are concerned, the use of a *satisfactory* coating is not enough. It may often be vital that a finishing material be Superb in every respect . . . that it possess qualities of outstanding beauty, long life, and unusual resilience as well. Choice of such a finish is a problem to be solved by experts, who can put their facilities, experience, and know-how to work in developing a custom-tailored coating with specialized characteristics. If *you* have a product-finishing problem that needs careful attention, may we suggest that you send us a sample for recommendations by our laboratory. No obligation of course. . . .

*Research, Quality, Service*

ROCKFORD VARNISH *Company*
ROCKFORD, ILLINOIS

*Manufacturers of Protective and Decorative Coatings*

*Affiliate*
GORDON BARTELS CO.
*Roller Coating Specialists*

Stabilized No-Swing Crane

operating simplicity. Any number of supplementary indicators, recorders or controlled diaphragm feeders can be operated from one pneumatic signal, permitting unlimited combinations of information and control, according to the manufacturer.

## Stabilized No-Swing Crane

A Tramrail stabilized crane which eliminates the usual swing of a load being hoisted or transported from one area to another was featured in the exhibit of the Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, at the Materials Handling Exposition held in Philadelphia May 18 to 22, 1953.

The manufacturer points out that elimination of load swing is of tremendous help in speeding tank dipping operations such an anodizing, chromodizing and similar finishing operations. It is an aid in various assembly operations since parts or assemblies being worked on can be held solidly in position. The no-swing feature is also advantageous for supporting traveling X-Ray equipment used for making studies of long objects. It makes possible the delivery of hot metal in a foundry by an automatic dispatch method direct from cupola to molding area.

The crane has a simple arrangement of hoisting ropes which form a triangular suspension. This permits a load to be held rigidly in place so as to eliminate longitudinal, lateral and rotational sway. Thus, a load can be raised or lowered through a considerable distance and yet with nothing more than the hoisting ropes supporting it, will remain as rigid as if guided in an elevator shaft.

McKeon's
"Liquid Sulphur"
FOR COPPER STRIPPING NON-DANGEROUSLY
Economical, Non-Electrolytic.
No special equipment required.
Write for descriptive brochure.
Sulphur Products Co., Inc.
GREENSBURG 8, PA.

## Detrex 63 Metal Cleaner

A metal cleaner specially formulated for use in the vitreous enameling industry has been developed by the Detrex Corporation, Box 501, Detroit 32, Mich., major manufacturer of industrial cleaning equipment and chemicals.

Described as a medium-high alkaline compound containing very high wetting and penetrating properties, the new cleaner has been trade-named Detrex 63.

One of its most outstanding assets, according to Detrex officials, is its exceptional ability to emulsify large quantities of mineral oils and greases and keep them in a state of suspension.

William H. Webb, managing consultant, head of the newly organized Enameling Section of Detrex' Chemical Processing Division, has specified the six basic requirements of a metal cleaner for enamelers

1. It must clean the work with no traces of soil to reduce the effectiveness of the enamel finish.
2. It must provide maximum long life for economy and uniformity.
3. It must create little or no sludge

These HONITE distributors are experts who have had years of experience in barrel finishing. Your local distributor is equipped to give you complete service on every phase of barrel finishing—equipment, Honite chips and Honite compounds.

He'll show you that HONITE is the longest-lasting, fastest-cutting natural barrel finishing abrasive available today. You'll see that no other barrel finishing abrasive—not even granite—retains its cutting edges as long as HONITE!

He'll show you why low-priced HONITE is not only best, but most economical for fine finishing to close tolerances, and for many other jobs involving a minimum amount of metal removal.

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Write today for free copy of "3M Barrel Finishing" . . . filled with helpful information on increased efficiency, lower costs.

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Made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

to keep costs and maintenance time low.

4. It must have high emulsification power.
5. It must afford low surface tension for thorough rinsing.
6. It must have top cleaning efficiency even under hard water conditions.

Detrex 63 has been formulated to fulfill all of the above basic requirements, according to Mr. Webb.

In operating tests of Detrex 63 it was discovered that, in an aqueous solution of from six to eight ounces per gallon, it may be boiled continuously without any appreciable effect on the concentration of the compound in solution.

When used by vitreous enamelers, Detrex 63 cleaner is particularly recommended for work requiring removal of non-pigmented drawing and stamping compounds, mineral and vegetable oils and grease, and quenching oils from ferrous parts prior to theenameling operation.

## EC Electrodizing

An anodizing process claimed to give a superior corrosion and abrasion resistant film to the surface of aluminum and its alloys has been announced by Philton Co., 200 West Ninth St., Wilmington, Del., licensing agent for Colonial Alloys Co., Philadelphia, developer of the process.

In the EC process, using properly balanced electrolytes, a relatively porous film is generated first. Through this film, a relatively non-porous film is induced directly on to the surface of the metal being treated.

In addition to power savings, economic advantages accrue from decreased cost of electrolyte, completion of four to five times as much work with the same equipment, reduction of down time and dumping practically to zero, about 50 per cent reduction in cooling cost, and negligible cost of heat sealing, the manufacturer states.

## Compound NR-31

Enthone, Inc., 442 Elm Street, Dept. PF, New Haven, Conn., has announced a product, designated as Enthone Compound NR-31, to prevent rusting of steel, cast iron and other iron alloys during storage. The product is a mildly alka-


PHOSPHATE COATINGS

Formulated to meet the strictest industrial and government requirements.

HIGHEST QUALITY

LOWEST COST

Priced at the lowest level for economical and profitable operation.

HOWARDITE

COMPLETE LINE OF PHOSPHATING CHEMICALS

WRITE FOR COMPLETE DETAILS

HOWARD PLATING INDUSTRIES, INC. 819 E. TEN MILE ROAD ROYAL OAK, MICH.

SERVING THE MID-WEST AND EAST

# GLOBE *DIRECT DRIVE TILTING* BARREL

## *Controls Tumbling for . . .*

- **BIGGER LOADS**
- **FINER FINISH**
- **LOWER COSTS**

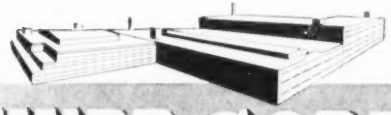
***Available in Kiln-Dried Maple or Steel Shells***

Globe tilting barrels save labor and time because they will take bigger loads and finish them faster. In many instances use of Globe Precision Barrels has eliminated costly hand operations. Globe's exclusive "work shifting" bottom gives complete agitation for uniform high-quality work.

Low speeds for non-ferrous and plastic parts assure quality finish without scratching or marring.

**FREE EXPERIMENTAL SERVICE**

Hupp's experimental laboratory is at your service. Send samples of parts to be processed and finished part. Hupp will analyze your finishing needs and make cost-saving recommendations. No charge or obligation. Write Today.



**HUPP CORPORATION**

**GLOBE STAMPING DIVISION**

1250 WEST 76th STREET • CLEVELAND 2, OHIO

SERVING INDUSTRY SINCE 1902

line, water-soluble material used in a concentration of 1 oz./gal. It is stated to leave almost no visible film on the steel. Tests have indicated that it will protect iron and steel against rusting in 100 per cent humidity for several weeks or more. The product is readily removed by washing with water. It contains surface active materials to facilitate rapid drying of water and to provide the uniform distribution of the anti-rust compound over the surface of the object.

The compound is recommended for prevention of rusting following cleaning, pickling, descaling, burnishing and tumbling.

## Adjustable Engineers Protractor

An adjustable, engineers protractor has been announced by the Way-Mac Manufacturing Co., 8112 Melrose Ave., Los Anegles 46, California. Called the Tractograf, it is a miniature drafting machine in itself. This precision instrument will be of interest to engineers, draftsmen, architects, artists and students.

Any number of angles, from zero to 180 deg. can be drawn instantly without turning, sliding, or moving the protractor out of position at any time. Simply swing upper rule arm to desired angle and lock adjustment knob. A magnifier, built-in over the registration mark, gives clear, hairline adjustment every time. Dial is white and easy to read. The 180 degree arc is calibrated in sharply defined 1 and 5 deg. divisions.

In addition, usually forgotten but often needed mathematical formulae are printed on the reverse side of the calibrated dial. A handy rule on the lower arm is also an added convenience.

The new Tractograf is made from clear, lifetime plastic with smoothly machined and beveled ruling edges for fast and accurate work. Two inches wide and 7 inches long when set at zero, it is handy for shirt or coat pocket. With ordinary care Tractograf should give many years of satisfactory service, according to the manufacturer.

Tractograf


**MASKING TAPE**

DIE-CUT TO YOUR EXACT SPECIFICATIONS FROM

SCOTCH BRAND

INDIVIDUAL PIECES • ANY SIZE OR SHAPE

*For quick, accurate masking operations.*

PHONE OR WRITE **PANOCO**

505 Carroll St., Brooklyn 15, N. Y.

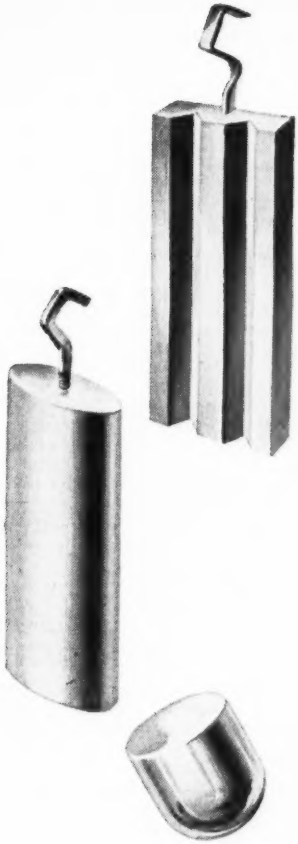

## PRODUCT LITERATURE

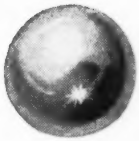
In requesting copies of catalogs or bulletins mentioned in this issue — use the READER SERVICE CARDS between the covers.

**ALKALUME PROCESS BROCHURE. Northwest Chemical Company,** 9310 Roselawn, Detroit manufacturer of specialized chemical cleaners, has announced a 12-page brochure completely describing the Alkalume Process marketed by the company.

Alkalume is a process for preparing aluminum, magnesium, and hard-to-clean steels for welding, and other finishing operations.

Alkalume cleans without harming the metal, dissolves and removes the surface oxides, reduces the surface resistance to a value of 0 to 10 microhms, and preserves for long periods of time a surface resistance between 10 to 20 microhms.





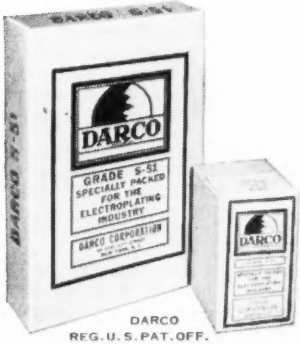
## CLEAN BATHS SAVE METAL!

Keep your plating solutions clean—and you'll save on scarce metals three ways. You'll be able to get a better finish with thin deposits . . . you'll cut your loss of rejected pieces . . . and you'll get full use of anode metal.

## *Start* CLEAN . . . *Stay* CLEAN!

Red Label Darco S-51—used regularly—is your best bet for adsorbing harmful impurities from your baths. It has been given a special desulfiding treatment that completely removes the danger of forming harmful metal sulfides which can cause dullness, poor adhesion and brittleness. It wets quickly . . . is particularly easy to mix into slurries.

Your local supplier carries Darco. Order your stock today—and make sure you get Red Label Darco S-51, the activated carbon made especially for purifying plating baths.




DARCO DEPARTMENT

**ATLAS POWDER COMPANY**

Darco General Sales Offices

**60 East 42nd Street, New York 17, N. Y.**

**Atlas Powder Company, Canada, LTD., Brantford, Canada**

**BURDETT FINISHING EQUIPMENT.** A 12-page, illustrated catalog describing the specially designed finishing equipment supplied by the company is available from **Burdett Manufacturing Co.**, 3433 W. Madison St., Chicago 24, Ill.

Fully described in the catalog is the "radiant heat" principle and the Burdett Radiant Heat Burner which generates infra-red rays. Burdett gas-fired conveyor type ovens, batch type ovens, drying ovens, burn-off ovens, and Burdett equipment designed for mold drying are described in the catalog, and suggested applications for the various types of equipment are listed. Also covered are oven heaters and warm air make-up units.

The spray booths marketed by Burdett are described, with special attention to operating and maintenance advantages. Down-draft and updraft water wash spray booths as well as special booths, are covered.

The line of metal parts washers supplied by Burdett includes conveyor type washers and monorail conveyor type washers. This equipment is also illustrated and described in the catalog.

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**ALSOP LIQUID PROCESSING EQUIPMENT. The Alsop Engineering Corporation**, 803 Keen Street, Milldale, Connecticut, is offering a new 32-page catalog written especially for plant personnel. It contains photos, diagrams (some full page size), and comprehensive information on the entire Alsop line of Stainless Steel Liquid Processing Equipment, including Filters, Filter Discs, Mixing and Storage Tanks, Portable Mixers, Fixes-Side and Top-Entering Agitators and Transfer Pumps.

The catalog treats each product separately. Their features are described clearly and completely with an explanatory text, numerous plant installation illustrations, design variations, detail drawings and parts lists, applications and performance data.

The photos and descriptions of the various standard units emphasize the compactness, simplicity and all 'round efficiency of Alsop Filters, Mixers, Pumps and Tanks.

The catalog also makes known the services of the Alsop engineering staff to design special units which might be required to fit the customer's specific job.

---

**PIPE BOOKLET. "POSITIVE CORROSION CONTROL"** is the title of an 8-page booklet published by **Bart Manufacturing Corporation**, 227 Main St. Belleville 9, New Jersey, manufacturer of nickel-lined steel pipe. Illustrated with many typical samples of nickel-lined pipe, fittings and flanges, the booklet discusses the exclusive Bart Lectro-Clad process and uses for nickel-lined steel pipe for corrosion protection. Included in the material are test results gathered over a period of 10 years in various installations, as well as descriptions of applications in the petroleum fields, organic and inorganic chemical industries, pulp and paper production and the handling of corrosive materials generally.

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**METAL WASHING AND TREATING MACHINES.** A catalog showing a complete line of washing and metal finishing machines has been published by the **Industrial Washing Machine Corporation** of Matawan, N. J. The catalog, printed in two colors and profusely illustrated, describes overhead monorail, conveyor type, cabinet type, rotary drum and vertical type machines adaptable to washing, rinsing, phosphate coatings, pickling, drying, or any combination of these processes.

It is pointed out that the success of the Industrial Washing Machine Corporation in 17 years of operation is due to the individual attention given each problem by the company's engineers. The catalog shows how specific problems were solved by specially designed mechanical features after consultation between Industrial's engineers and those of the client company.

The wealth of information in Industrial's catalog will prove of great help to those seeking a solution of their own washing and treating problems.

**NICKEL ANODES FOR SALE**

*All Sizes*

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366 Broadway — New York 13, N. Y.

Telephone: COrtlandt 7-4077

# Opportunity Section

## SOUTH FLORIDA TEST SERVICE

**Testing—Inspection—Research—Engineers**

Consultants and specialists in corrosion, weathering and sunlight testing.

**4201 N.W. 7th St., Miami 34, Florida**

## INDUSTRIAL SALES

Manufacturer of Circo Vapor Degreasing Equipment and Degreasing Solvents desires experienced sales representation in established territories.

**Topper Equipment Company**

**Clark Township, Rahway, N. J.**

Infra Red Oven manufactured by C. M. Hall Lamp Co. Approximately 5 years old. Used very little. In excellent condition. Can be seen in operation. Complete with 72 bulbs. Priced for quick sale.

**Box No. 83, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio**

Our laboratory expansion program creates two openings—one for a Stain & Filler Formulator and Color Matcher; and the other for a Lacquer Formulator. Approximately five years experience desirable. Liberal insurance, hospitalization and pension plans. Will work in new laboratory, now under construction. Write Personnel Manager, American-Marietta Company, 901 North Greenwood Avenue, Kankakee, Illinois. If you prefer, 'phone collect Kankakee 3-5561.

## FOR SALE

**2 Divine Four unit type V automatic straight line polishing machines. One with 7½ HP motors and one with 10 HP motors. Both with conveyor, drive, belt and all motors, starters and applicators. 220 V 3 phase, 60 cycle. Used but in good condition. Reasonable. Box No. 81, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio.**

## HELP WANTED

**Salesmen - Industrial Finishes**

Minnesota — Wisconsin — Iowa

Must be experienced, young and aggressive.

**Frost Paint & Oil Corp.**, Minneapolis, Minn.

## STEEL TANKS FOR SALE (New, Unused)

Two (2) Steel Tanks, 35"x96"x35" deep, lead lined with 4-lb. chemical lead sides and 10-lb. bottoms. One (1) Steel Tank, 30"x76"x36" deep, lead lined with 8-lb. chemical lead sides and 12-lb. bottom.

No reasonable offer refused.

**Address: D. L. BROMWELL, INC. 710 12th St., N.W. Washington 5, D. C.**

## ELECTRO OR INORGANIC CHEMIST

Permanent position in research laboratory of growing and well established New England manufacturer of metal finishing compounds. Must have an MS degree or equivalent. Experience desired but not necessary. Must be capable of conducting supervised research on new developments for the electroplating industry. Liberal insurance, vacation and retirement benefits. Compensation for moving arranged. Salary open. Send full details in first letter. Box 82, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

## FINISHING EQUIPMENT FOR SALE

Paasche Automatic Airpainting and Drying Unit Complete with Water Wash Booth.
R. C. Mahon Spray Booths with Blower, Pump, Filter, Turntable, Etc.
Barrett Centrifugal Enameler for Filwhirl or Dipspin Methods.
Binks and DeVilbiss Pressure and Mixing Tanks. Sizes 5 to 125 Gallons.
C. M. Hall Infra Red Oven, Degreasers, Blowers, Motors, Switches, Etc.

Write for Particulars, or Inspect at

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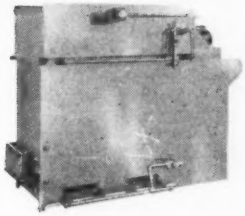
*The Finishing Touch* — **By J. A. Patterson**

***"You'll like working here . . . You can see th' Boss coming . . . And he always comes in that door."***

# BLAKESLEE degreasers use less solvent



Solvent savings are assured when Blakeslee Solvent Vapor Degreasers are installed. Dual-Vapor Control is only one of Blakeslee's original features designed to give you lower operating costs than other degreasers. With continued solvent savings, Blakeslee degreasers soon pay for themselves.

**G. S. BLAKESLEE & CO.**

Established since 1880. Manufacturers of solvent vapor degreasers—metal parts washers—Blacosolv degreasing solvent.*

**Write today for full information. Chicago:** 1844 South 52nd Avenue, Chicago 50, Illinois; **New York:** 381 Fourth Avenue, New York City 16, New York; **Canada:** G. S. BLAKESLEE & CO. LTD., 18 Cranfield Road, Toronto 13.

**BLACOSOLV IS STOCKED IN WAREHOUSES FROM COAST TO COAST.*

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# THE GREATEST WALLOP OF THEM ALL . . .

## . . . BUT IC POLYESTERS CAN TAKE IT!

When the recent A-Bomb rocked the Nevada desert, IC Polyesters were there. In a test house, erected 3,500 feet from ground zero, were a number of mannequins in various positions simulating human beings.

Seconds after the blast the house was a shambles. The roof blew away, glass and plaster flew, timbers fell, and the walls were charred from the wave of heat.

Two days later, when inspection teams were permitted to enter the area, though strewn around in grotesque positions, the mannequins were relatively unharmed.

To take this kind of Sunday punch they HAD to be STURDY. Ten years experience in the development and manufacture of IC Polyester Resins plus the fabricating skill of the L. A. Darling Company, Bronson, Michigan, made this outstanding performance possible.

If you have a fabricating problem where TOUGHNESS counts, call your nearest IC Finishes Division representative or write Commercial Resins Department, at either Cincinnati, Ohio or Newark, New Jersey.

Photographs courtesy Federal Civil Defense Administration

# Interchemical Corporation

## Finishes Division

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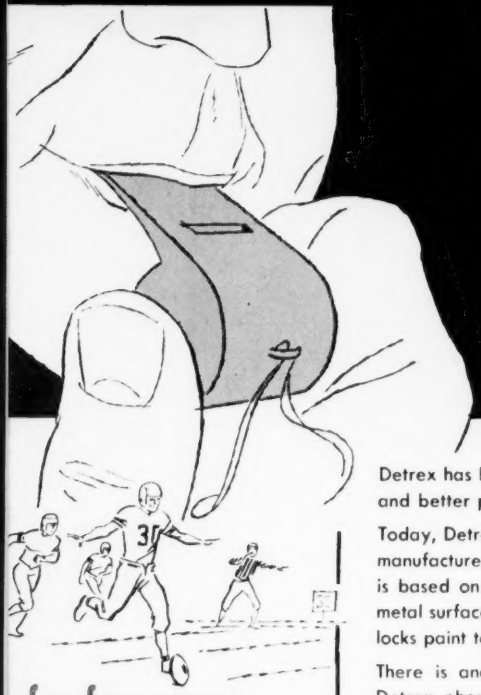
LOS ANGELES, CAL. • NEWARK, N. J.

# give the GO -signal to DETREX for guaranteed phosphate coating



Detrex has been working with phosphate coatings for rust prevention and better paint adhesion for over twenty years.

Today, Detrex phosphate coatings have gained rapid acceptance by manufacturers of painted products from coast to coast. This acceptance is based on proven advantages . . . exceptional rust protection for metal surfaces, excellent fine-grained crystalline structure that literally locks paint to the metal, and economy and ease of application.

There is another important reason for the growing popularity of Detrex phosphate coatings . . . Detrex One-Stop Service. This exclusive Detrex service places the responsibility for the *complete* process in the hands of one competent company. On present operations, both cleaning and phosphating chemicals are produced by Detrex—on your new applications, Detrex produces the equipment, too. In either case, *the results are guaranteed!*

For a more durable paint finish, for economical, easy-to-control processing, for *guaranteed* performance—give the GO-signal to Detrex.

## for free survey

*At no obligation to you, the Detrex field man in your area will come in and survey your present or proposed operations. There is no cost for the service. The result will prove to you the money-saving advantages of Detrex service. Just fill out and mail the coupon below . . . our field man will call you for the most convenient time to come in.*

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**Dept. 308, Box 501,**
**Detroit 32, Michigan**

Please have the Detrex man in our area make an appointment to survey our operations to point up ways of cutting cleaning costs.

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ALKALI & EMULSION CLEANERS • DRYCLEANING
EQUIPMENT • PHOSPHATE COATING PROCESSES